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IRON AGE

NOVEMBER 22, 1951
VOL. 168, NO. 21

THE IRON AGE
Editorial, Advertising and Circulation Offices, 100 E. 42nd St., N. Y. 17, N. Y.

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TOM C. CAMPBELL, Editor

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DIGEST

of the week in metalworking

PAGE 41 **AIRLIFT OPENS UP IRON ORE COUNTRY**
Without the airlift men who have ferried in prodigious amounts of heavy construction equipment and supplies the remote Quebec-Labrador iron ore field would still be inaccessible. Charlie Hoyt's crew of 36 pilots on the airlift have hauled 13,886,300 lb in 4 months on three Dougs.

PAGE 43 **MAGNESIUM WILL BE PLENTIFUL NEXT YEAR**
At their seventh annual meeting, magnesium men took a look at the future. Shipments have doubled in a year and 1951 output should reach 40,000 tons of primary. Next year it should hit 97,500, enough for all demand—but a major war would change the picture. Civilian market outlook is bright.

PAGE 44 **PIPELINE DEMAND STAYS AT RECORD LEVELS**
The only limit on pipeline expansion during the coming year will be availability of steel. Natural gas is the big demand but emphasis is shifting over to petroleum. This will put the biggest bite on small diam. pipe with 12 to 20 in. coming next. Large pipe supply will not meet demand in '52.

PAGES 46, 46A **STEEL INDUSTRY, WORKERS STATE CASES**
While the CIO United Steelworkers fashioned a formidable wage package to hand the steel industry, Benjamin F. Fairless, U. S. Steel president, made known management's case against calls for a "substantial" wage hike. He rapped the union's equality of sacrifice theme with facts.

PAGE 59 **"PLANNERS" BACK GOVERNMENT STEEL MILLS**
Government mill sponsors say that defense takes half of the nation's steel. DPA figures include strictly civilian output and are called "cockeyed" by industry. Ten pct would be a more realistic figure, it's said. "Defense-supporting" industries are the cause of the disagreement.

PAGE 69 **SCRAP DRIVES STEPPED UP TO BEAT WINTER**
Western mills push collections to help the rest of the country. Wreckers test junked autos for smog-producing qualities. Utah steel fabrication has boomed in the last 10 years. Foundry costs have risen sharply this summer. See little chance for any more foundry coke output in the area.

PAGE 71 **PRIORITY FOR TOOL ORDERS FROM EUROPE**
ECA machine tool expert says overseas orders, defense or not, will get priorities. Needed to offset M-41. Big production boost is called for. Current backlog is $1.3 billion, about 2 year's output, will hit $1.5 billion at end of fiscal year. NPA concentrates on subcontracting as output answer.

PAGE 81 **CERAMIC COATINGS SAVE CRITICAL ALLOYS**
Even with sub-zero cold outside and 1800°F inside, ceramic coatings on aircraft exhaust headers resist impact. So far, only 19-9DL has been enameled. Coated sample parts completed 1623 hours on trans-Pacific flights in good shape. Previously, deterioration set in after only 650 hours.

PAGE 86 **FIVE PROBLEM STAINLESS CASTINGS TAMED**
Distortion, shrinkage, and feeding difficulties made problems of five castings poured by a stainless steel foundry. A jet engine support with multiple spider-like arms and a 2-ton 4-bladed propeller were among the jobs to be cast to close tolerances. All five are now successfully produced.

PAGE 90 **CUTTING TRANSFER MACHINE DOWN TIME**
Several months' production experience on a big 118-tool transfer machine has shown the value of steps taken to minimize trouble and down time. High production and trouble-free operation has proven that good machine design and good casting preparation eliminate most causes of high down time.

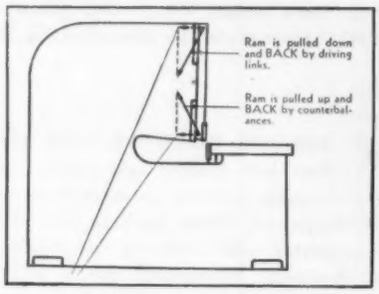
PAGE 123 **WASHINGTON RULES STEEL SUPPLY, DEMAND**
Consumers who used to call on steel company heads for help are now seeking their steel in Washington. Basic supply demand relationship doesn't mean much any more because Washington rulings can make any item tight or easy. That's why makers aren't excited about easier cold-rolled sheets.

NEXT WEEK **CERMETS MAY FIND BIG USE IN JET ENGINES**
Pressed-and-sintered ceramic-metal mixtures are still in the experimental stage, but it looks like they will replace some strategic alloys in jet turbines. Hydrostatic and hot pressing seem the best forming methods. Materials on test include carbides, oxides, alumina, chromium, and beryllium.

Write for New Cincinnati Shear Catalog S-60

Keep up to date on Shearing!

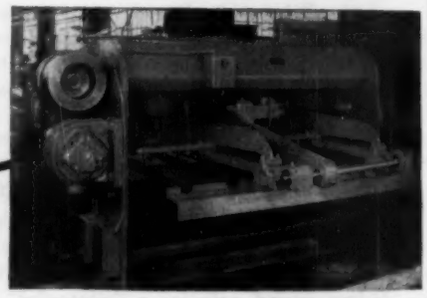
Learn about... the exclusive features illustrated below—and many others.



Cincinnati Non-Float Ram

Cincinnati Sure-Set Knife Aligner

Cincinnati Hydraulic Holddowns



Cincinnati Magnetic Sheet Support

Just off the press This up-to-the-minute, illustrated catalog will give you a complete description of the speedy, accurate All-Steel Cincinnati Shears in capacities from 12 gauge to 1¼-inch steel plate, in 4-foot to 24-foot lengths. Also, many special features for particular needs are illustrated and described.

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The Iron Age
FOUNDED 1855

The Harried Executive

BEING a company executive these days is no cinch. Compared to today's grind such a job 20 or 30 years ago was paradise. Industry's top men and those thousands who direct the backbone of small business don't talk much about their troubles.

Yet those troubles are multiplying. The number of ads in the papers for top jobs show that it takes more than many want or can give.

Many on the way up feel they are ready for the job. Maybe they are. Maybe now is the time for top level people to take far more chances on "youngsters." Since there is no substitute for experience the only way to get it is to be subjected to it.

What are some of the hurdles these days for a top man who must have a deep sense of responsibility to his country, his company, his employees and his stockholders? They don't make light reading.

The man must be a walking example of balanced judgement, integrity, poise, generosity, fairness and civic cooperation. He must practice what he preaches. If he isn't all of these things he hurts the cause of true free enterprise. Everyone has his eyes on him waiting for a stumble. To be successful he can't falter.

As he plans for the next decade in his business he must size up world and domestic conditions. Would peace in Korea affect his business now? In the long run?

With a new round of wage increases coming up what does he do about prices? If he raises them too high he may lose a market. If not enough he may hurt the company's position—and the position of workers and owners. While he considers this he is under government control. His hands are tied; yet he is responsible.

What happens if he makes good? He gets more work, faint praise and probably a new set of doctors. If he is wrong or can't stand the guff he is written off. The board of directors looks for a new man.

Step right up candidates, and take your chance. But you take the bitter with the sweet. In time you too will become harried and learn the futility of honest excuses.

Tom Campbell

Editor

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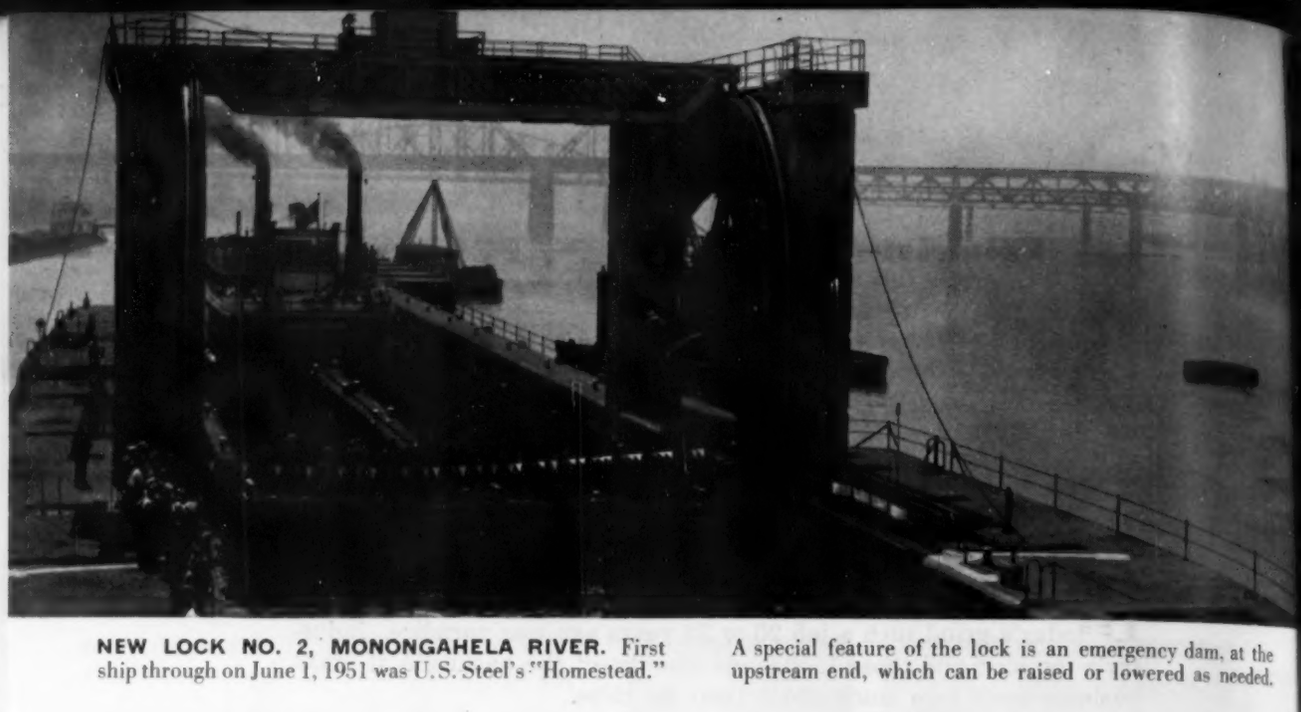


NEW LOCK NO. 2, MONONGAHELA RIVER. First ship through on June 1, 1951 was U.S. Steel's "Homestead." A special feature of the lock is an emergency dam, at the upstream end, which can be raised or lowered as needed.

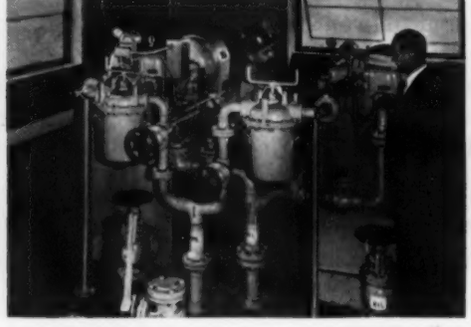
ENGINEERS PICK SUN HYDRAULIC OIL FOR NEW LOCK ON MONONGAHELA

Last year the Monongahela, busy river that flows past Pittsburgh's Golden Triangle, carried 2,000,000 more tons of shipping than the Panama Canal. This year its tonnage promises to be higher still, for on June 1 the U.S. Army Corps of Engineers put in operation their new Lock No. 2, near Braddock.

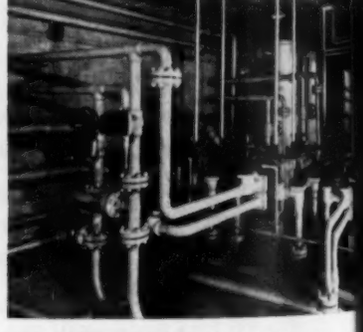
The entire mechanism of this lock . . . gates, butterfly valves, and capstans . . . operates hydraulically, and a Sun Hydraulic Oil was chosen as the medium. Why? Because this vital job required an oil that would prevent corrosion and rust; that would retain its original specifications for the life of the equipment; and that would flow freely at low temperatures, yet not thin out at high. The engineers in charge chose a Sun Hydraulic Oil over all other oils because they felt it could be best counted on to keep the lock in operation and river traffic moving.

For complete information on Sun Hydraulic Oils and recommendations as to their use in your operations, write for booklet IA-11.

HYDRAULIC CAPSTANS, operated by Sun Hydraulic Oil, are used when tows, too long for the locks, have to be broken up into units and pulled through mechanically.



SYSTEM'S HEART, operating the lock mechanisms, is a pair of Oilgear hydraulic pumps. They supply 2,800 gallons of Sun Hydraulic Oil at pressures up to 1,100 psi.



UNDERGROUND SYSTEM of pipe lines supplies all hydraulic devices. It is designed so that it will continue to function even though the chamber is completely flooded.

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Dear Editor:

Letters from readers

ybernetics

r:

On p. 124 of your Nov. 1 issue I te an article, "Cybernetics, A Super ience," which I believe might be of nsiderable interest to Spanish eaking people.

A friend of mine is publishing a w scientific-technical monthly maga- ze called "Nucleo" and I would ap- reciate your sending him tear sheets f this article and permission to re- roduce it in Spanish.

F. R. MORRAL

pokane

acts and Figures

ir:

We are interested in statistical com- ilations of the type you have an- ually published in January. In your an. 4, 1951 issue these statistics are yellow section titled "1951 Metal ndustry Facts" which included pp. 79 through 374. Issues of preced- ng years had similar sections.

Could you advise if this particular ompilation is separately bound, and f so, how may we obtain copies of ll issues of this compilation.

Perhaps you are also in a position to uggest additional sources of infor- nation of this type, either as pub- lished by yourselves or others.

M. P. SIEGER
Vice-President—Engineering
nited Engineering & Foundry Co.
Pittsburgh

Sorry but the statistical sections of our annual issues are not bound separately. You can obtain complete copies of the 1949, 1950 and 1951 annual issues at $2.00 each. For additional sources you may subscribe to "Survey of Current Business" from the U. S. Government Printing Office at $3.00 a year. For a good many 1950 business statistics there is "Business Statistics," avail- able from the Superintendent of Documents, U. S. Government Printing Office at $1.50. The National Industrial Conference Board, 247 Park Ave., New York 17, N. Y., sells an economic almanac which contains a good many useful statistics.—Ed.

Rotary Drill

Sir:

On the Newsfront page of your Nov. 1 issue there is mentioned a patent covering a rotary drill for cut- ting glass which is supposed to be available to industry.

Will you kindly advise me if you have further information on this sub- ject, if not, can you refer us to the proper source.

W. G. KELLER

Keuffel & Esser Co.
Hoboken, N. J.

Further information on this rotary drill may be obtained from the Chief, Patent Branch, Office of the General Counsel, U. S. Atomic Energy Commission, Washington 25, D. C., identifying the subject by its Patent No. 2,570,119 and title "Recovery of Carnotite from its Ores."—Ed.

Croning Process

Sir:

REFERENCE STATEMENT P. 83, NOV. 8 ISSUE REGARDING PRODUCTION FOUNDRY MAKING CASTINGS BY CRONING PROCESS. PLEASE WIRE NAME OF FOUNDRY. WE ARE INTERESTED IN PURCHASING CASTINGS MADE BY THIS PROCESS.

RAMSEY

Continental Motors Corp.
Muskegon, Mich.

Foundry referred to is captive production shop. The only job foundry we know is Builders Iron Foundry, Providence, R. I. See THE IRON AGE, Nov. 15, p. 111.—Ed.

A New Era

Sir:

In your issues of July 5, 12, 19, 26 and Aug. 9 there appeared a series of articles entitled "Boron Steels, A New Era In Alloy Metallurgy" by D. I. Brown, your technical editor.

Permission is requested to reproduce certain parts of this series, principally Part I, in the Journal of the American Society of Naval Engineers.

J. E. HAMILTON
Secretary-Treasurer

The American Society of Naval Engineers, Inc.
Washington

Popular Features

Sir:

Would you kindly send me tear sheets of the following articles which appeared in your Oct. 25 issue.

"Ordnance Using X-ray to Test Complex Assemblies."

"Simple Design Speeds Blower Wheel Assembly."

"How to Get the Most From Your Lathes."

J. BUSEL
Production Engineer

Phoenix Bridge Co.
Phoenixville, Pa.

Casting Revolution

Sir:

Would you kindly send us a reprint of the article "Continuous Casting Revolutionizes the Brass Industry" by D. I. Brown, which appeared on p. 106, of your Sept. 6 issue?

F. G. SPACE
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Mr. H. H. Manning, vice president of Champion DeArment says, "What we like about the Lindberg Induction Heating Unit is its accessability for inspection and preventative maintenance. It has been used 8 hours per day since its installation and we have had practically no interruption of production."

LINDBERG

HIGH FREQUENCY DIVISION

Fatigue Cracks

by Charles T. Post

On Our Way

Some of the generals and admirals still are fretting about a lagging rearmament program, but we can reassure them. Production of military goods is well on its way. We can tell by reading the newspapers.

Possibly you noticed the Associated Press article out of Washington last week which said the government was alloting "only 60 pct of the steel plate" needed to meet "scheduled production of 930,000 cars and 24,000 trucks" during the first quarter. You get the implication that Typical American Jones will find it tough to buy his usual armored car next year. On the other hand, if we can get a new heap with the fenders made out of steel plate, we're willing to wait for it. It may be one of those cases of the auto industry being forced by necessity into building a product more acceptable to the consumer.

The same article says that NPA "asked the industry to make up the shortage by using a more expensive but more available form of steel, called 'conversion steel.'" That shows the metallurgists are on the job. Last war, when the going got tough, they came up with the National Emergency Steels. Already, this time, they've come up with the Boron series. And now, Associated Press would have us believe, they've come up with some new analysis called "conversion steel." We hope we aren't letting the cat out of the bag by telling you that this new steel is made from a special type of iron developed in Eastern Europe, called "Waffle iron," after the inventor, Theodosius Waffle.

Doesn't it make you feel smug ... and realize that the country is in good hands?

Time Marches On

Deep down, we can't be too tough on the AP's Washington reporter, whose home ground is scandal in the RFC, Congressional debate, and the life and letters of the President. But somehow we are a little shaken whenever *Time* magazine works out on heavy industry. Don't get us wrong. *Time* puts a flavor into the news that makes it as entertaining as back fence gossip. Careful reading gives us an understanding which qualifies us, if for nothing else, to answer correctly *Time's* current events quizzes.

Couple of weeks ago, *Time* really did a job with all the trimmings on U. S. Steel, the Fairless Works, and the industry in general. A photo page in full color on steelmaking was enlivened no end by a caption indicating that a blooming mill at Bethlehem was turning out strip.

And the week before that, a feature on the machine tool industry had a description of a milling machine that made it out a first class drill.

Say what you may, the little researchers that *Time* plucks from the Vassar daisy chain are cute as bugs, and the crew-cut Yale boys are eager and enterprising. And before they put up a rebuttal, we'll admit right now that the same articles written by a Carnegie Tech or M.I.T. graduate would not smell half so sweet.

Fuller Explanation

Here is how *"Natural Resources Notes,"* published by the Chamber of Commerce of the United States, answers the question, "What is a BTU?": "A British Thermal Unit is a unit of heat measurement that represents approximately the amount of heat created by burning a wooden safety match all the way to the end. By this measure, it would take 14,000 matches to equal a pound of coal." Big matches or little matches?

Puzzlers

Those who counted the multiplying amoebae with greater success than we, say that there were 1,099,511,627,776 in the bowl at the end of 40 min. Our experts on this were C. E. Norton, Chicago; B. Mitchell, Smith & Wesson, Inc.; J. P. Durkin, Institute of Trend Research; W. A. Pearson, Royal Typewriter Co.; J. S. Prifogle, Belden Mfg. Co., and R. W. Huff, Canton, Ohio

If you take a 1 in. diameter rod 1 in. long and sharpen it to a chisel point you will find that it will just fit the three holes in last week's puzzler. For the disbelievers here is a picture.

Here is one for the clock-watchers: A clock strikes six in 5 sec. How long does it take to strike twelve?

On any burnishing problem

DEPEND on DU-LITE for a Sparkling Finish

Courtesy Bevin Bros. Mfg. Co.

After tumbling with an ordinary compound, these kids' bicycle bells came out a dull lifeless gray. Substituting Du-Lite's #3 Burnishing Compound completely removed the gray soapy film, and gave the bells a bright mirror finish at a substantial saving of compound per month.

What's YOUR problem?

Du-Lite's service to industry is complete from research on specific metal finishing problems to installation of processing equipment. Du-Lite's line includes cleaners, strippers, blacking agents, wetting agents, passivating agents, rust preventatives, burnishing compounds etc. for any type of metal.

See your nearest Du-Lite Field Engineer or write for more information.

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MIDDLETOWN, CONN.

Rush information on your products for finishing following metals:

Aluminum..... Steel..... Stainless Steel.....
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METAL FINISHING SPECIALISTS

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PRECISION *plus*

. . . threads cut to Class 7 tolerance

Continuous threads cut on studs must meet exacting requirements to withstand the high pressures and temperatures to which pressure vessels, steel pipe flanges, fittings, and valves are subjected.

At the R.E.C. Corporation, New Rochelle, N. Y., continuous 1⅜" 8P threads are cut to within pitch diameter limits of .002 on 12-foot heat-treated bar stock of 269 to 311 Brinell hardness. The fully threaded bars are then cut into the desired stud lengths.

By using Double Head LANDMACO Leadscrew Threading Machines equipped with Hardened and Ground 2" LANCO VV Heads, threads ranging in diameter from ½" to 2" are cut in one pass with consistently fine finish to Class 7 tolerances. The leadscrew provides a positive, mechanical means of feeding the work into the die heads, thus assuring the maintenance of close lead tolerances.

Even on this precision threading operation, net production is good, averaging 36 linear feet per hour at a cutting speed of 25 surface feet per minut An average of 108 linear feet of threads is c between chaser regrindings, resulting in low to cost and minimum down time.

Having given many similar outstanding perform ances in other fields, LANDMACO Machines c help to cut costs, step up output, and improve finis and accuracy in your thread production.

For complete information, write for Bulletin H-75.

LANDIS MACHINE COMPANY

WAYNESBORO, PENNSYLVANIA

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

Conventions & Meetings

Nov. 26-30—American Society of Mechanical Engineers, annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 29 W. 39th St., New York.

Nov. 28-30—Abrasive Grain Assn., annual meeting, Hotel Statler, Buffalo. Association headquarters are at 27 Elm St., Worcester, Mass.

Nov. 29-30—Machine Knife Assn., annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 1108 Clark Bldg., Pittsburgh.

Dec. 3-5—American Institute of Chemical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute headquarters are at 120 E. 41st St., New York.

Dec. 3-5—Institute of Cooking & Heating Appliance Manufacturers, winter convention and management conference, Netherlands Plaza Hotel, Cincinnati. Institute headquarters are in the Shoreham Hotel, Washington.

Dec. 4—Spring Manufacturers Assn., semi-annual meeting, Hotel Biltmore, New York. Association headquarters are at 249 Main St., Bristol, Conn.

Dec. 5-7—National Assn. of Manufacturers, annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 6-8—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh. Institute headquarters are at 29 W. 39th St., New York.

Dec. 10—Can Manufacturers Institute, annual meeting, New York. Institute headquarters are at 1126 Shoreham Bldg., Washington.

1952

Jan. 5—American Home Laundry Manufacturers Assn., annual meeting, Morrison Hotel, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

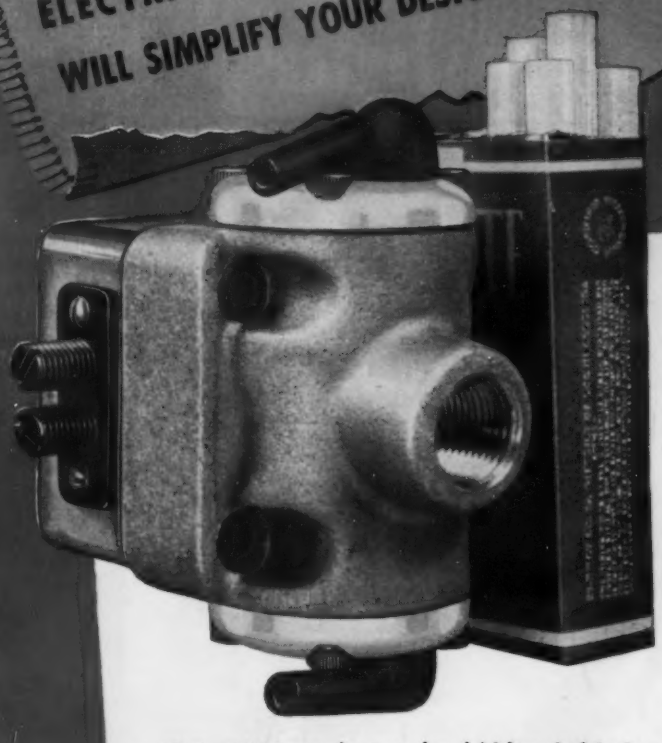
Jan. 8—Mining & Metallurgical Society of America, annual meeting, Mining Club, New York. Society headquarters are at 11 Broadway, New York.

Jan. 8-9—Power Crane & Shovel Assn., annual meeting, Washington, D. C. Association headquarters are at 74 Trinity Place, New York.

Jan. 8-10—National Constructors Assn., annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 50 E. 41st St., New York.

Jan. 10-11—Aluminum Window Manufacturers Assn., annual meeting, Miami. Association headquarters are at 74 Trinity Place, New York.

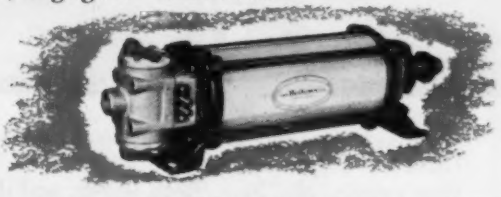
Use air—and THIS COMPACT, 4-WAY ELECTRICALLY-CONTROLLED VALVE WILL SIMPLIFY YOUR DESIGN PROBLEMS



SO COMPACT it can be hidden behind a king size package of cigarettes; so fast even short stroke air cylinders can't match its speed; so safe it can be run submerged, flooded with coolant, or piled with chips; and so sturdily built we guarantee its solenoid-control units against burnout.

That, in a nutshell, describes the Bellows Electro-aire Valve — the electrically-controlled, air powered, air valve. It combines in one complete "packaged" unit a four-way directional valve, piston speed regulators, and low-voltage electrical controls.

You'll find its easy adaptability to the most complex electrically-controlled air circuits simplifies design. Its guaranteed freedom from "Burnout" assures minimum downtime, negligible maintenance.



Write for Your Free Copy of Bulletin AU-250 . . . specifications, wiring diagrams, dimensions of Bellows *Electroaire* Valves. Address Dept. IA 1151.

1155

● The ELECTROAIRE VALVE is standard equipment on all Bellows "Controlled-Air-Power" Devices arranged for electrical control. It is adapted for direct connection to or remote control of any air cylinder of suitable capacity.

The Bellows Co.
AKRON, OHIO

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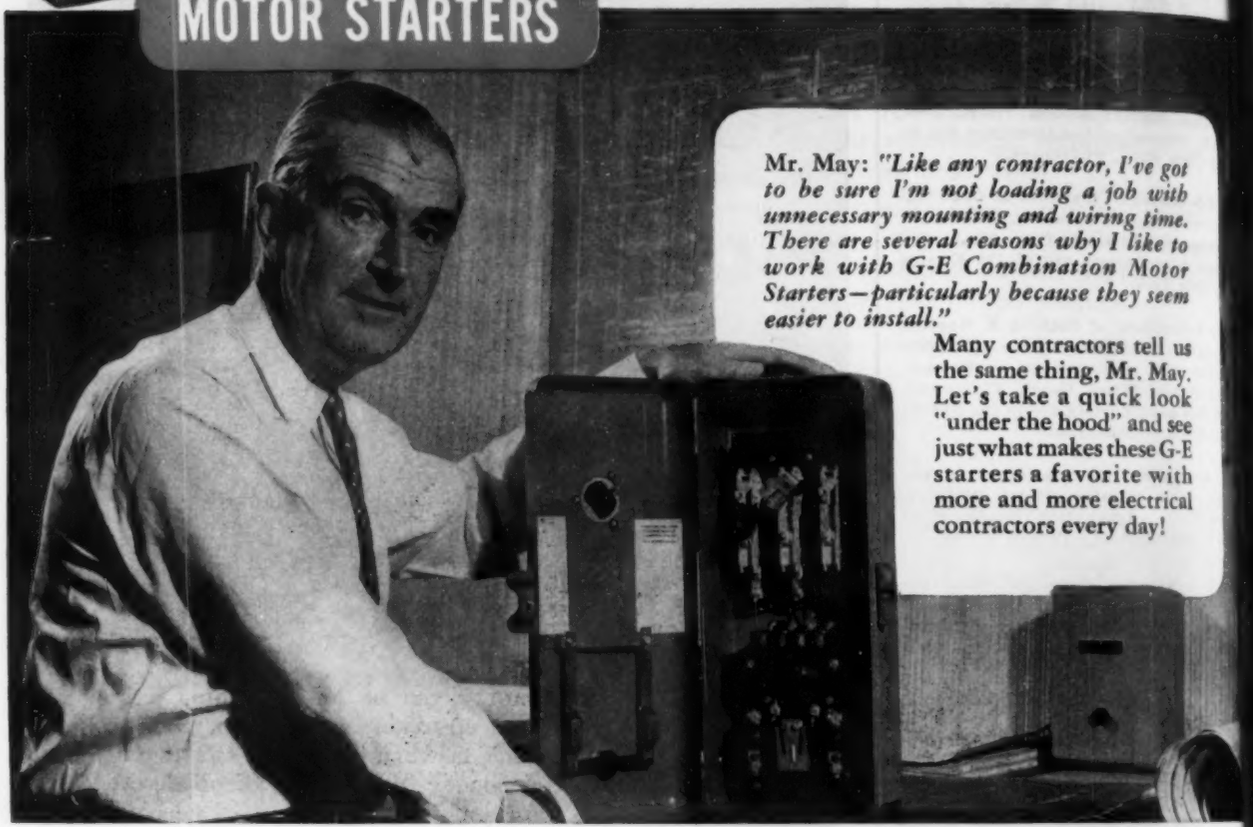
COMBINATION
MOTOR STARTERS

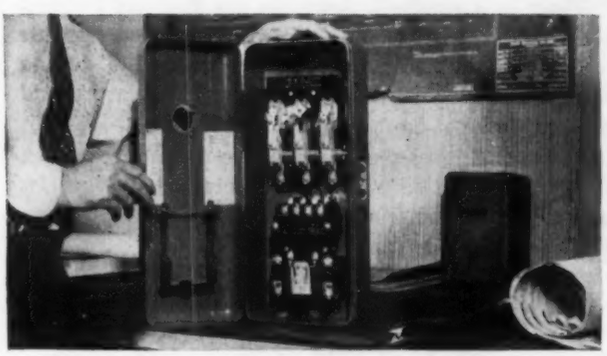
...save wiring

F. G. MAY, ELECTRICAL CONTRACTOR

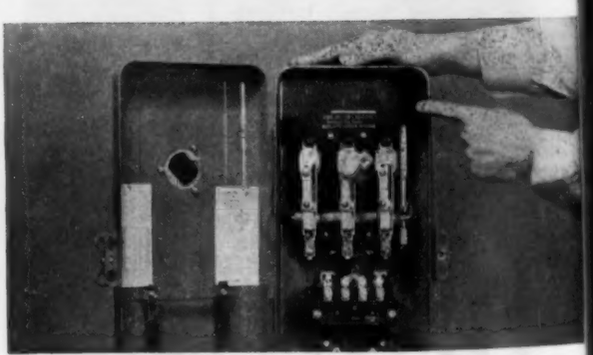


Mr. May: *"Like any contractor, I've got to be sure I'm not loading a job with unnecessary mounting and wiring time. There are several reasons why I like to work with G-E Combination Motor Starters—particularly because they seem easier to install."*

Many contractors tell us the same thing, Mr. May. Let's take a quick look "under the hood" and see just what makes these G-E starters a favorite with more and more electrical contractors every day!



1 Mr. May: *"Suppose we start with the mounting. There's a real time-saver!"*
That's right, Mr. May. Both starter and disconnect switch are mounted in one case. Thus, they're installed as a unit! You save wiring time and your customer gets a neater installation!



2 Mr. May: *"Wiring room is mighty important to a contractor."*
Then you should like the layout of this starter. There's plenty of room at top and bottom for line and load wiring. Of course, we take care of wiring the disconnect switch to the starter at the factory.

GENERAL ELECTRIC

730-24

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Indications are that Washington will very soon start some sort of system for indicating relative priority among various defense projects for delivery of machine tools. Other short items may also be included.

Such a system was used during World War II, worked fine at the start and finally collapsed under an avalanche of super super-priorities.

► A waste pickle liquor process now under development will save some 75 pct of the original sulfuric acid needed. The pilot plant not only saves acid but produces iron sinter, ammonium sulfate and free sulfur as byproducts.

► Army Ordnance is expected to soon start tests on boron steels for tank track shoes. They are now made of 8640 steel.

► Servo equipment now being developed by Armour Foundation for the Air Materiel Command is designed to permit fatigue testing of a sample in controlled resonant vibration. A solution to this problem would permit fast, accurate tests for the fatigue failure of simple specimens.

► Armour is also working on refractories for melting titanium. Contamination from refractories is probably the industry's biggest problem. Since fluorine and the other halogens have little or no solubility in titanium, the task is to develop fluoride refractory material able to withstand the high melting temperature (3510°F) of titanium.

► Some German machine tool builders are not making much effort to sell in the U. S. This group doesn't expect to be able to retain U. S. customers after the emergency but others disagree—will push for U. S. sales.

► Army Ordnance is making progress in standardization of engine parts. During World War II the same tank may have had as many as 10 different engines. Present setup permits four engines to be used in 11 different vehicles. During the last war Ordnance depots carried identical parts of many truck makers—each listed under different numbers.

► Slated to start operation Dec. 1 is what may be the largest acid neutralization plant in this country. The new unit, at U. S. Steel's Fairless Works, will be able to neutralize 150,000 gal of pickle liquor per hr—using lime as the neutralizer.

► A new corrosion resistant "stainless paint" has been under test on steel pipe installations for 18 months. Experience indicates it may replace galvanized pipe on some applications. The pipe is coated by a dip. Aside from the fact that the dip is not tar, details are still secret.

► Scientists computing the potential cost of atomic power often figure the fuel cost at zero; actually, it is equivalent to 4¢ a ton coal. The high cost of atomic power would result from the huge capital expenditure needed for a reactor.

It is estimated that known reserves of uranium in the U. S. would be sufficient to produce power at the 1946 consumption rate for the next 10,000 years.

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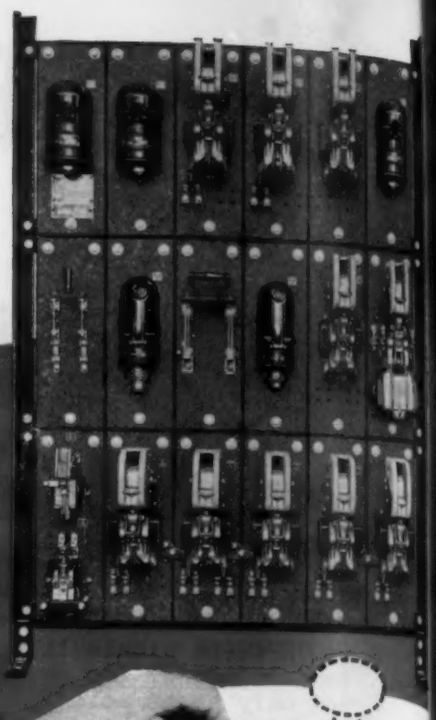
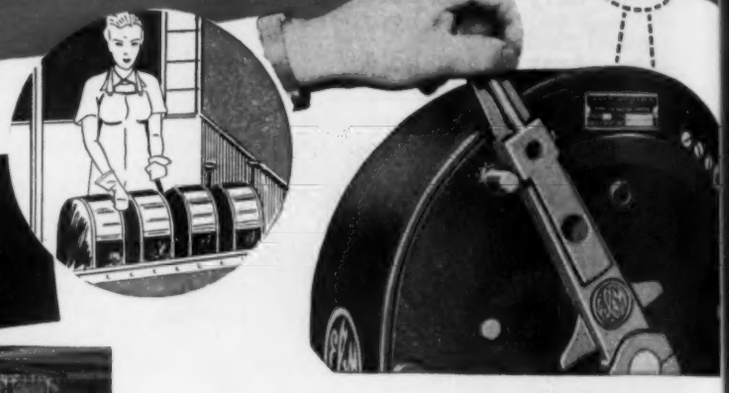
8 *Important Features of* **EC&M** *Magnetic Control*

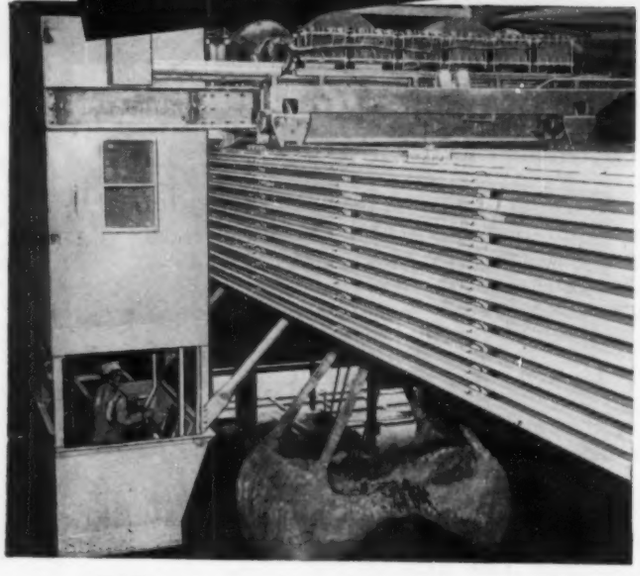
1 Time-Current Acceleration
2 Line-Arc Contactors
3 Wright Hoist Circuit
4 Tab-Weld Resistors
5 Cam Master Switches
6 Safer Electrical Interlocks
7 Bolted, Welded Frame
8 Quick Contact Renewing



NARROW WIDTH, SHORT THROW *Master Switches*



Where easy manipulation speeds output



There's nothing like a 2-motor bucket crane or any extra-motion crane (such as ladle, double-trolley, etc.), to bring out master switch quality and popularity.

EC&M Cam Masters are popular because they are narrow in width. Several of them can be closely mounted so that an operator can conveniently reach them all without changing position.

Also lightening the task of the operator is the short-throw from off to full-on position of these masters. This materially reduces an operator's movements. Specify EC&M Bulletin 1190-A Cam Master Switches.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

CIVILIAN AIRLIFT: Opens Iron Ore Country

There'd be no Quebec-Labrador ore in '54 without Charlie Hoyt's boys . . . They fly in supplies, equipment to build railroad . . . Save $4 million and a year of time—*By Tom Campbell.*

Imagine it is autumn 1954. Then make believe you are at Seven Islands, Quebec, as the first diesel hauled load of Quebec-Labrador iron ore arrives. Canadian and American diplomats will be there. There too will be top heads of Hollinger-Hanna and the five American steel firms which form most of the Iron Ore Co. of Canada. They will be there to see the reward of hard work and $200 million well spent.

The old heads of Labrador Exploration and Mining will be there too—spic and span in city clothes for the "occasion." They will be a little wistful because then everything will be routine and humdrum—a project completed, with only minor challenges left.

Scene Changes—Drs. Joe Retty and Ab Moss, early geologists on the job, will be dreaming of base metal discoveries—to come. Bill Durrell, general manager, will be feeling the tightening strain of correct letters, files, details and executive neurosis—but with a personal compensation of a job well done.

By that time Jack Little, ass't. general manager and general trouble shooter, can no longer lay claim to being a bushman. Four years of meetings, trips to the States, tough assignments and big business rigmarole will have left its mark of "civilization." Making up for this will be more home life and occasional chats about the past with Bob Ross, his Seven Islands friend, Indian benefactor and raconteur deluxe.

Unsung Heroes—Jules R. Timmins, calm Hollinger head, and George Humphrey, thoroughly practical boss of M. A. Hanna, will be there figuring how to cut costs and how to raise the annual ore shipments from 10 million to at least 15 or 20 million tons.

Behind the crowd of notables or in the air above them will be a tight knit little group who "remember when." They will be Charlie Hoyt's flyers who have had front seats on this undertaking since 1946. Without them there would be no ore in 1954. If a tote road had been built to supply construction of the railroad instead of flying the stuff in, the additional cost would have been $4 million, and more than another year in getting out the ore.

Airlift Boss Charlie Hoyt . . . "What I could do with bigger planes."

In that group will be the old-timers in Charlie's Ungava-Labrador airlift—an airlift that, excepting military ones, has had no equal for sustained flying in the world. Most nonchalant of all will be Hank Gates, the orig-

WORK HORSES: Dougs like this one shown at Knob Lake Landing are in the air 10 hr a day, 300 hr a month. Three of them have hauled 13,886,300 lb in 4 months. The airlift has flown in a total of 25.8 million lb plus passengers.

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AIR HOT RODS: Pilots get this view as they approach mile-36 landing strip to lay down food, men, lumber, and equipment. Planes have cross-wind gear so they can land regardless of wind direction. (Photo courtesy Paul Fisher of *Bee Hive*.)

inal flyer when the lift started. Tight-lipped Jack Scott, chief pilot of Hollinger Ungava Transport Co.—subsidiary of Iron Ore Co. of Canada—will be as quiet as ever. Photogenic Wes MacIntosh, who likes to test Douglas DC-3's to see how much they'll take, will be more interested in his boy's train setup by that time

Tommy Griffiths, who had a terrific number of missions with the RCAF in World War II, will be no more talkative than he was last week. Nor will Ollie Burton, Don McClintock and Pete Klyskow be any more bored than they were last month when the lift hauled the startling total of 4.2 million lb of equipment, food and men.

Record Haul — Totaling the score for a 4-month period recently, Charlie Hoyt boss of HUT found that his crew of 36 pilots handled 13,886,300 lb with the three Dougs alone. From the start of the lift in 1948 to Nov. 1 this year, HUT has flown the amazing total of 25.8 million lb including more than 17,400 passengers.

Iron Ore Co. of Canada has had to fly everything—men, machines, shovels, tractors, power plants, kitchens, food, fuel—beyond 12 miles from Seven Islands in order to build the 360-mile railroad from Knob Lake to Seven Islands. Flying 10 hr a day each Doug lands with its cargo at anyone of the eight air strips not counting the base at Seven Islands. Another airstrip is to be completed this month. These landing strips, built from air cargo, are named for their mileage from Seven Islands.

Charlie Hoyt's only gripe was when he saw the big Fairchild C-119 plane on loan from the U. S. Air Force fly in practically intact such items as Bucyrus Erie scrapers, Caterpillar loaders and tractors, 7-ton International TD-14A tractors, Tourneau rooters and Dominion shovels. His men had flown in similar machines but only after they had been cu apart to be reassembled an welded after landing. "What could do with bigger planes," Charlie moaned.

Rock Bottom Costs — The mos startling information on the air-lift is cost figures. It will be news to some air-freight-minded people back in the States to know that Hoyt's airlift has costs down to 16¢ a ton-mile, using DC-3's. Each Doug chalks up about 300 hr per month.

In 1946 when Canadian Pacific flew in materials and men for Hollinger-Hanna the cost was around 75¢ a lb from Seven Islands to Knob Lake (320 air miles). Hoyt's boys for some years have had the cost down to 5¢ a lb for the same distance.

The big job ahead for next spring and summer is to transport 7000 tons of cement, 2000 tons of reinforcing steel and a miscellaneous 1000 tons—all for the construction of the power plant at Menihek. This means that the three Dougs must fly 10,000 tons a distance of 300 miles from Seven Islands and sandwich it in between other hauls.

The next time you hear about Quebec-Labrador ore remember HUT'S "Far Away" (ungava in Eskimo) lift is bringing it closer.

OLDTIMERS: Hank Gates (right), first pilot on the airlift and Wes MacIntosh (left), like other HUT fliers, often fly 120 hr a month.

MAGNESIUM: Good Future Supply

Industry association holds seventh annual meeting . . . See supply meeting demand next year—unless there's war . . . Need new producers in growing industry—*By R. L. Hatschek.*

Future outlook for magnesium was the main theme of the Magnesium Assn. seventh annual meeting held in New York last week.

Despite today's heavy military and defense bite on the basic metals industry, magnesium supply is expected by some to meet all demand next year unless there is a full-scale war. At present, magnesium supply is sufficient for all military needs and about 50 pct of all civilian demand—and the latter has been on a sharp upsurge since World War II.

"Sorry, Secret"—Today's rate of stockpiling is classified information but Perry Helser, chief of National Production Authority's magnesium and titanium branch, stated that the government would like to see an increase there.

Otherwise Mr. Hesler confirmed this supply-demand relationship. He also gave some production figures for 1951. The total output of primary magnesium for the first three quarters was about 23,500 tons and an estimate of 16,500 tons for the current quarter will bring the total to some 40,000 tons for the year. To this should be added another 8000 tons of secondary magnesium metal.

107,500 Tons Next Year—The government anticipates a 1952 magnesium supply of 97,500 tons of primary and 10,000 tons of secondary metal. This is to come from six government-owned plants of 98,000-ton capacity and Dow Chemical Co.'s 24,000-ton capacity.

Dow's shipments have doubled in the past year and more than 75 pct of these are going to defense production. And magnesium production is climbing rapidly. The big hitch comes in sheet supplies, particularly thin gages. But new 4-high mills are under construction to supplement the two that are now operating.

Good Civilian Markets — The magnesium industry, like the aluminum industry, has no fear of over-production even after current military programs have ended. The industry's eye is on civilian markets all the time and the metal has already proven its worth in many uses. Huge markets exist in shipping containers and other materials handling equipment, in the trucking industry where lighter weight pays off in dollars and cents, in all sorts of portable equipment and household items.

Other large markets exist for magnesium in the metals industry. Alloys like 75S aluminum, which contains 2.5 pct magnesium, help make Aluminum Co. of America the largest single consumer of magnesium. Remember that production of a pound of titanium requires an equal weight of magnesium—and the titanium industry is growing at a rate rivalling Jack's beanstalk.

Growing Pains—But a mushrooming magnesium industry is going to have its share of growing pains. One of them, in these days of government control and "investigitis," is going to be the question of monopoly, magnesium men say. Just look at recent investigations of the aluminum industry and the government's attempts to get new, small producers to join the "big three."

STEEL: Finished Shipments Down in September

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH Carbon	Alloy	Stainless	Total	Pct of Total Shipments	TO DATE THIS YEAR Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	92,541	21,502	1,030	115,073	1.9	765,544	* 178,792	*13,952	958,288	1.6
Blooms, slabs, billets, tube rounds, sheet bars	149,002	48,479	1,303	198,784	3.2	1,260,092	425,231	13,665	1,698,988	2.9
Skelp	12,133	.....	.....	12,133	0.2	109,699	.....	.....	109,699	0.2
Wire rods	70,637	1,038	284	71,959	1.2	618,682	12,224	3,562	634,468	1.1
Structurals	382,171	3,770	5	385,946	6.2	3,600,923	49,568	58	3,650,549	6.2
Steel piling	30,290	.....	.....	30,290	0.5	315,411	.....	.....	315,411	0.5
Plates	627,782	28,529	1,049	657,360	10.6	*5,540,501	298,944	12,918	*5,852,363	9.9
Rails—standard	130,724	16	.....	130,740	2.1	1,278,593	156	.....	1,278,749	2.2
Rails—all other	6,057	6	.....	6,063	0.1	94,201	52	.....	94,253	0.2
Joint bars	10,738	.....	.....	10,738	0.2	100,113	.....	.....	100,113	0.2
Tie plates	32,864	.....	.....	32,864	0.5	337,490	.....	.....	337,490	0.6
Track spikes	12,373	.....	.....	12,373	0.2	124,279	.....	.....	124,279	0.2
Wheels	32,177	.....	.....	32,177	0.5	296,716	140	.....	296,856	0.5
Axles	18,589	73	.....	18,662	0.3	167,204	504	.....	167,708	0.3
Bars—hot rolled	516,020	192,680	3,230	711,930	11.5	*4,873,994	1,700,804	31,177	*6,605,975	11.2
Bars—reinforcing	160,136	.....	.....	160,136	2.6	1,413,521	.....	.....	1,413,521	2.4
Bars—cold finished	124,120	27,637	3,097	154,854	2.5	1,150,165	250,507	30,741	1,431,413	2.4
Tool steel	2,651	10,886	.....	13,537	0.2	25,692	103,919	.....	129,611	0.2
Standard pipe	231,437	174	1	231,612	3.7	2,186,949	1,246	32	2,188,227	3.7
Oil country goods	138,294	12,488	.....	150,782	2.4	1,248,097	149,751	.....	1,397,848	2.4
Line pipe	230,715	.....	.....	230,715	3.7	2,182,827	779	.....	2,183,606	3.7
Mech. tubing	50,584	25,570	557	76,711	1.2	500,888	219,887	4,703	725,478	1.2
Pressure tubing	26,274	2,537	820	29,631	0.5	204,127	16,961	7,596	228,684	0.4
Wire—drawn	251,932	3,797	2,490	258,219	4.2	2,362,720	39,161	23,351	2,425,232	4.1
Wire—Nails staples	67,354	.....	.....	67,354	1.1	645,453	.....	27	645,480	1.1
Wire—Barbed twisted	18,145	.....	.....	18,145	0.3	168,249	.....	1	168,250	0.3
Wire—woven fence	31,414	.....	.....	31,414	0.5	318,050	.....	.....	318,050	0.5
Wire—bale ties	9,020	.....	.....	9,020	0.1	81,074	.....	.....	81,074	0.1
Black plate	93,181	.....	.....	93,181	1.5	740,142	.....	.....	740,142	1.3
Tin & terne plate—hot-dipped	125,807	.....	.....	125,807	2.0	1,270,145	.....	.....	1,270,145	2.2
Tin plate—electrolytic	232,352	.....	.....	232,352	3.7	2,145,843	.....	.....	2,145,843	3.6
Sheets—hot rolled	573,808	26,547	2,443	602,796	9.7	5,974,050	231,626	29,838	6,235,514	10.6
Sheets—cold rolled	679,760	8,545	8,242	696,547	11.2	7,137,955	88,280	74,036	7,300,271	12.4
Sheets—galvanized	157,170	.....	.....	157,170	2.5	1,535,387	907	.....	1,536,294	2.6
Sheets—other coated	21,486	.....	.....	21,486	0.4	197,406	.....	.....	197,406	0.3
Sheets—enameling	9,117	.....	.....	9,117	0.2	144,596	.....	.....	144,596	0.2
Electrical sheets strip	8,637	52,330	.....	60,967	1.0	107,235	472,276	.....	579,511	1.0
Strip—hot rolled	182,223	2,237	647	185,107	3.0	1,607,334	30,139	5,862	1,643,335	2.8
Strip—cold rolled	145,174	2,191	14,374	161,739	2.6	1,403,674	22,048	147,249	1,572,971	2.7
TOTAL	5,696,887	471,032	39,572	6,207,491	100.0	54,235,021	*4,293,902	*398,768	*58,927,691	100.0

During 1950 the companies included above represented 96.0 pct of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

PIPELINES: No Letup in Demand

Great expansion of pipelines continues in '51 . . . Defense demands still heavy . . . Construction at record rate . . . Steel the big factor . . . Top priority for oil—*By E. C. Beaudet.*

The tremendous growth of pipelines crisscrossing the nation has rivaled any expansion the country has ever seen. For the past several years pipeline construction has broken one record after another. This year will be no exception. Construction during 1952 will be limited only by steel allocations.

Pipeline construction during the last 15 years has never been able to meet demand, and the need for additional carriers now is even more intense. New industrial plants and increased defense production from existing and expanded ones will result in greater demand for natural gas and low sulfur residual fuel oils. Demand for refined petroleum products will grow to meet increasing military requirements. Loss of Iranian oil will put a greater strain on the country's supply,

New Building—To meet these needs construction companies have been working at fever pitch. During 1951, 17,500 miles of domestic pipeline projects were completed or under way, according to *Oil & Gas Journal* statistics. The major portion, 11,400 miles, are for natural gas lines. Crude oil lines account for 2900 miles and refined products 2800.

Future plans and proposals call for a total of 20,500 miles of additional pipelines, 14,500 for natural gas, 3500 for crude and 2400 for refined products. Amount of steel needed for these projects is astronomical. Undoubtedly many of them won't be filled for some time to come.

For the first quarter of 1952, 368,000 tons of pipe have been allocated for pipelines. This is substantially lower than the 472,230 tons slated for the fourth quarter of this year. However, allocations and deliveries are two different things. Like everyone else pipelines have had difficulty cashing their CMP tickets.

Shift Quotas—At the end of October, Petroleum Administration for Defense was forced to revalidate 37,000 tons of fourth quarter pipe allocations into the first and second quarters of 1952. PAD officials believe this figure will be greatly increased by the end of the year. As a result some projects scheduled for completion early in 1952 will be pushed into the last half of the year and 1953.

Until now the emphasis has been placed on gas line construction. When the Controlled Materials Plan was put into effect several large gas lines were under construction. The threatened shortage of gas in certain areas of the country in the event of severe winter weather made prime consideration for these lines necessary for industrial welfare.

PLUGGING A LEAK: Workmen at Etna, Pa., plant of Spang-Chalfant install a new pipe galvanizing kettle. Replacement was done in the record time of 14 hours.

One major program virtually completed is the 1400-mile line of the Texas-Illinois Natural Gas Pipeline Co. from the Gulf Coast to the Chicago area.

Oil Priority—With these vital projects for the most part taken care of, emphasis has been shifted to petroleum lines for the first half of next year. With crude lines already operating at capacity more lines are needed to increase refinery output.

As a result, demand for pipe during the first half of the year will fall heaviest on those sizes below 12 in. in diameter. Next will be those sizes ranging from 12 to 20 in. Demand for large diameter pipe will still be stronger than supply.

Plan Copper Mine Projects

Two major projects to relieve the acute copper shortage were announced last week. Both are mine developments in Michigan.

Full production may be reached in 3 years at the White Pine Copper Co. ore body on the Upper Peninsula. To start activities at the field, Reconstruction Finance Corp. has approved a $57,185,000 loan, largest since World War II.

Engineers estimate that, in full operation, the property can yield 72 million lb of ore each year.

White Pine is a subsidiary of the Copper Range Co., Boston.

Reopen Mines—Elsewhere in the state, mines once considered exhausted on the Gogebic Range of the Puritan Mining Co. will be reopened as a deep mining operation. The mines were formerly known as the Puritan, Ironton, Yale and Colby mines.

These will now be operated as the "Peterson Mine," named for Arthur F. Peterson, vice-president, Mining Div., Bethlehem Steel Co. Puritan Mining Co. is owned jointly by Bethlehem and Youngstown Sheet & Tube Co.

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OAL: Pushes Bid for Rail Power

Coal Research directors see coal pulverizer, coal-burning gas turbine put through paces . . . Project reaches final phase . . . Drive to regain market lost to fuel oil—*By G. Elwers.*

A coal-burning locomotive gas rbine, operating for the first me with powdered coal as fuel, s demonstrated this week to rectors of Bituminous Coal Re-arch, Inc. This marked the be-nning of the final phase of R's multi-million-dollar pro-am to re-establish coal as the imary railroad fuel. (THE IRON GE, Oct. 26, 1950, p. 84.)

What the directors saw was a mplete power plant and coal lverizing plant designed and ilt for eventual installation in locomotive.

Use Lump Coal—It will utilize e same inexpensive lump coal sed in steam locomotives, pulver-e it, burn it in a combustor, re-ove most of the fly ash, and irect the hot gases thus produced rough a gas turbine. The tur-ine will drive dc generators fur-ishing power to main drive otors.

The electric drive arrangement similar to that used on diesel comotives. The turbine and rive are somewhat similar to the ower plants of oil burning gas rbine locomotive and steam tur-ine locomotives. What is new is e utilization of powdered coal as gas turbine fuel.

Coal has never been success-fully used to power a power-pro-ucing gas turbine. But BCR is onfident that this unit, and an-ther being built by the Elliott o., Jeannette, Pa., will do the job. The demonstration for BCR direc-ors was the first in a series of tationary tests of the unit with coal as a fuel. For this purpose t is set up at the American Loco-motive Co., Dunkirk, N. Y.

Phases of Project—Experiments t Dunkirk have been carried on for about 2 years. First phase consisted primarily of evaluation of crushing, pulverizing, combustion, and ash removal equipment.

An Allis-Chalmers gas turbine built originally for oil refinery use was utilized in these tests. Though it operated much of the time on gas from combustion of both coal and oil, reportedly several hundred hours of operation on coal alone were accumulated.

The second phase of the Dunkirk operations began about a year ago when the present locomotive power plant, designed and built by Allis-Chalmers Mfg. Co., Milwaukee, was installed. Since installation, this unit has been going through operating tests using oil as a fuel. Now the final testing, using coal, has begun.

Answer to Oil—Financed and directed by the Locomotive Development Committee of BCR, this development represents the coal industry's answer to the diesel locomotive and the potential threat of the oil burning gas turbine locomotive. Diesels have so completely taken over the railroad picture that no new steam locomotive has been built in the U. S. in over 2 years.

And existing ones are being retired fast. The reason is that diesel locomotives, though their fuel is more expensive than coal, are so much more efficient than reciprocating steam locomotives that their operating costs are much lower.

BCR expects its locomotives to have much lower operating costs than diesels. The thermal efficiency will not be so high, but the lower fuel cost is expected to more than offset this.

Cheaper Maintenance—And the gas turbine, being a rotating device, is expected to have much lower maintenance costs than reciprocating diesel engines. Low fuel costs will be the major advantage over oil burning gas turbines.

Skeptics about the BCR locomotives point to several difficulties. One is the high idling losses of gas turbines. Another is the cost of maintaining the complex coal crushing equipment. But most important is the difficulty of removing the ash particles resulting from combustion of the coal. A high percentage of these must be removed from the gas, or they will erode the turbine blades as would a blast of abrasive.

CHURCH SERVICE: Employees of the Plymouth, Ind., wirebound box and crate division of Gerber Plumbing Fixture Co. attend religous services in the plant on company time. Services are held for 30 minutes each Wednesday at 7 a. m.

Truck Gas Turbine Proves Out

Boeing Airplane Co.'s gas-turbine engine, under test for more than a year in a truck which has traveled 15,000 miles in 550 hours, has proved highly successful according to Henry Hill, assistant chief engineer of the turbine project.

Weighing only 200 lbs and producing 175 hp, the engine has shown that it is highly adaptable to heavy road vehicles.

STEEL STRIKE: Chances are 50-50

USW wage demands are toughest yet . . . Government intervention seen as inevitable . . . Guaranteed annual wage is main demand . . . No figure given on pay hike—*By J. B. Delaney.*

There's trouble ahead on the steel labor front. Chances are better than 50-50 there will be a strike. A government-imposed settlement is virtually inevitable. The outcome is likely to leave scars that will be a long time healing.

The wage package drawn up by the CIO United Steelworkers at Atlantic City last week is perhaps the most formidable ever tossed at the steel industry. It includes demands the industry knew were coming some day but which it hoped would never materialize.

Annual Wage—Most important of the 22-points in the wage program is the guaranteed annual wage. Philip Murray, president of the CIO and USW, says the union means business. He believes the industry can grant this concession without undue hardship. He also knows the demand will encounter the stiffest opposition—and from all appearances is prepared to hold out for it.

This will be the first time such a demand has been made on a major basic industry. Previous applications of it have been in scattered companies in food processing, soap, meat packing, leather, and in service industries.

Experience in these industries gives no inkling of its effect in an industry such as steel. If the USW wins it, its extension to other mass production fields such as automobiles is almost a foregone conclusion.

"Substantial" Raise—As expected, the union will ask for a "substantial" wage increase. Mr. Murray did not spell this out. He said the figure is a negotiable one. He observed, however, that the 4 or 5¢ allowable under wage stabilization is not enough.

The union also will ask for the union shop. This, too, will meet a strong opposition despite success of the USW in union shop elections over the country. Many steel executives are opposed to it in principle, feeling that workers should have the right to decide whether they want to join the union.

The USW also will demand complete elimination of geographical wage differentials, eight paid holidays, increase of shift premiums, time and one-half pay for Saturday and double time for Sunday, improved vacations (3 weeks for 15-year men as opposed to the present limitation to 25-year workers), renegotiation of incentive systems, severance pay for all employees regardless of reason for termination of employment, elimination of all remaining wage and salary inequities, improved seniority provisions, improved reporting allowance, better grievance and arbitration machinery, improved pensions and social insurance "where contractually appropriate" (in basic steel pensions are not subject to negotiation until October 1954), better protection for workers entering military service and improved safety and health measures.

". . . couldn't spare him—but we let them take it over to the park on their lunch hour for a little honeymoon."

Call in Washington—Reaction in the industry indicates that the union is to come out with new contract before most agreements expire at midnight Dec. 31 it will have to do some horse trading on its demands. Otherwise the negotiations will become deadlocked and the government will have to step in to dictate a wage price settlement.

The union is dissatisfied with results of efforts during the last 4 years to work out incentive systems under the work load program. Phil Murray believes the time has come to renegotiate "present inadequate incentive plans and methods." Hundreds of grievances have developed over dissatisfaction with incentives. Many times these grievances have led to costly strikes and slowdowns.

Reason why the union demands are so lengthy is that this is the first time since 1946 the USW has had the opportunity to reopen the complete contract. Despite the short time available for negotiation—the union expects to hold first meetings with major producers late this month—Mr. Murray feels there is a good chance agreement can be reached before the deadline.

Approximately 1 million union members will be affected. This includes workers in basic steel, in aluminum, and in steel fabricating and processing industries.

Hardship Cases to Get SSB Help

Salary Stabilization Board says it will approve increases in pay designed to correct hardships and inter-plant inequities. SSB says it is unable to agree on a formula for such salary increases. It will deal with individual applications.

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Does Labor Want Equality of Sacrifice?

By Benjamin F. Fairless, President, U. S. Steel Corp.

EDITOR'S NOTE: *Interest in coming steel wage negotiations goes far beyond the steel industry and its workers. Many expect steel to be the pattern-setter that will measure labor's success or failure in its drive for a sixth wage round.*

While United Steelworker policy makers were mixing strong wage medicine in Atlantic City last week, U. S. Steel President Benjamin Fairless broke management's long silence on the subject with a "surprise" speech in Cincinnati. Since he had gone there to accept an award as "outstanding industrialist of the year," his speech was a surprise only in that it dealt directly with his industry's real problem of wage demands. He marshalled facts against the union's equality of sacrifice theme.

Because of the great interest in steel wage negotiations, and because of the major role Mr. Fairless will play, THE IRON AGE has decided to print his remarks in full. Following is his appraisal of the issues:

This expression of your confidence, and the more than generous words of praise which you have accorded me tonight, are doubly welcome on this occasion, however, because they are so different from some of the things I have been reading in the newspapers lately. It appears that we are on the eve of another election year and that some of our political leaders, and certain pressure groups, are clearly attempting once again to make American industry their whipping boy in the coming Presidential campaign.

All the old, familiar phrases about "short-sighted men" and "special privilege" have been dusted off in the past few weeks; and we are told on the highest political authority that the "special interests" are "ganging up" on price controls at the expense of the rest of the country. The self-same Government officials who have been "watering" our national currency, by roundabout methods, for nearly twenty years—and who alone have had the power to prevent inflation of our money supply—are now trying to make our people believe that today's high prices are due entirely to industry's greed for profits.

Now it is an old political custom, of course, for candidates to try to escape the embarrassing consequences of their self-indulgence by leaving the baby on somebody else's doorstep; but frankly, I'm getting a little tired of finding it on my doorstep. So I think it's time we tried to restore this poor and unwanted child to its wayward father's fireside.

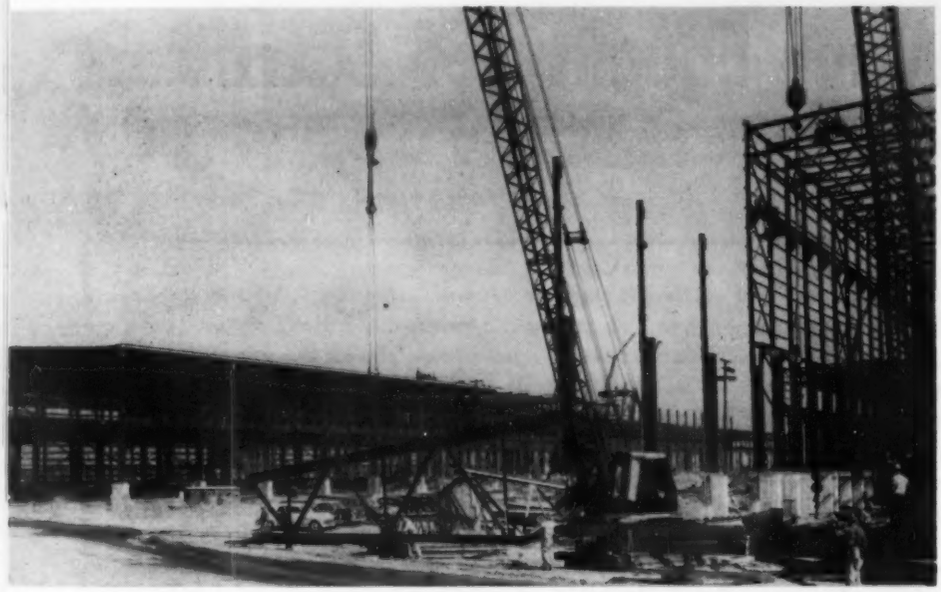
Benjamin F. Fairless . . . Tired of finding the baby abandoned on his doorstep.

Everybody is for stabilization as long as it is the other fellow who's getting stabilized; and a lot of people are demanding "equality of sacrifice," when they really mean: "Let's you and him go broke!"

Ladies and Gentlemen, I don't think many of us here at home can talk very much about sacrifices, because the only great sacrifices that have been made so far have been made by the men in Korea. But if we are going to discuss the term in the strictly economic sense, I can think of nothing that would please the stockholders of U. S. Steel more heartily than a little "equality," because—of all the various groups which divide the money that comes in from our customers, and that is our only source of income—our share-owners today are doing all the sacrificing.

If we take the first nine months of this year, and compare them with the first nine months of last year before the armament program was really under way, we find that U. S. Steel has paid 19 per cent more, this year, for labor. It has paid 21 per cent more for the supplies and services we bought from others. And it will have to pay the Federal Government 100 per cent more in taxes. We also produced nine per cent more steel this year, but in spite of that, the profits of the company went down 25 per cent.

So when I hear some of these other groups talking



"A strike is unthinkable . . . the decision rests entirely with the union." Annealing building, first structure on the Morrisville, Pa., Fairless Works site rises.

piously about "equality of sacrifice," I can't help wondering if they really want to take a 25 per cent pay cut as the company has. And when anyone tries to tell you that the "special interests" have declined to absorb "one penny of costs, or to forego one penny of profits," you can write that off under the heading of "politics as usual." The statement isn't true of U. S. Steel. It isn't true of the steel industry, and it isn't true of America's big industries in general.

The owners of U. S. Steel have provided the additional tools and facilities that have made our increased production possible. They have taken the risks and they stand to suffer the losses, if any. The Government, on the other hand, has put up nothing and risked nothing for our business; but so far this year, it has walked off with nearly four times as much of our money as our stockholders have received in dividends.

No tears in Washington

Now I do not expect that many tears will be shed—either in Washington or elsewhere—over the fact that the owners of my company have suffered a reduction in their dividends this year. What does concern me gravely, however, is a 34 per cent drop in the amount that was left to be plowed back into the business. That means that for every three dollars of profits we were able to spend last year on modernization and expansion of our plants, we can now spend only two—and that is a fact that should be of vital concern to our Government officials, our workers, and to every man and woman in America.

The strongest and most skillful worker in the world cannot produce steel with his bare hands. He must have furnaces and mills and raw materials, and plants and fuel, and power at his fingertips. In fact—at our new plant in Morrisville—w will have to provide abo $90,000 worth of equipme for each individual productio worker who will be employe there. And that is only the be ginning. We must develop gre new sources of iron ore, w must open new coal mines, pa for new ships, and so on. T provide the increased tonnag that our country needs and ex pects of us, U. S. Steel alon must spend hundreds upon hun dreds of millions of dollars and that money has to com from somewhere.

To get it is the responsibil ity of management; and no on —so far as I have been able t discover—is going to give it t us as an act of charity. We hav to earn it, or we have to get i from others and pay them fo the use of it. Either way, our ability to increase pro duction depends directly upon the profit that we mak —and the bare, uncompromising fact of the matter i that our power to expand our productive facilities ou of earnings has been reduced by more than one-thir in the course of a single year. So, as you see, we hav certainly been stabilized!

Loose talk about strike

But just as men cannot make steel without furnaces so the reverse is also true. The finest and most moder steel plant in the world cannot produce a single poun without men; and today there is a great deal of loos talk about the possibility of another steel strike.

Now to me, a strike is unthinkable. I do not believ that patriotic American workmen are going to cut of the production of steel in this country at a time whe the whole future of our nation—and the lives of thou sands of our men in Korea—must depend primaril upon the uninterrupted flow of weapons for our na tional self-defense. But whether there is to be a strik or not is a decision which rests, of course, entirely wit the union. It is a decision that no one else can mak and for which no one else can be responsible.

I believe there is a responsibility on the other side however, to see that the men have no just and compel ling cause to strike; and I would like to discuss tha responsibility for a moment, factually, simply, and a dispassionately as I can.

You know, of course, that as we sit here tonight, committee of the Steelworkers' Union is meeting i Atlantic City to formulate demands for another roun of wage increases; and in case you may have lost coun this will be the Sixth Round in the six years since V-J Day. Leaders of the Union have publicly stated tha

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their demands will be "substantial" and that they intend to upset the wage ceilings which have been established under the Government's stabilization program. Industry leaders, for their part, have made it clear that any rise in wages will necessitate a corresponding increase in steel prices. The negotiations, therefore, involve broad questions of public policy which go far beyond the scope of collective bargaining in these days of wage and price control; and the outcome will determine whether the wage-price spiral is to be speeded upwards.

Now I don't know where—outside of an asylum perhaps—we could find anybody who doesn't want a bigger income; so the truth is that nobody really likes a wage freeze—not even me. On the other hand, of course, everybody just naturally favors a ceiling on prices so that he can buy more goods with less money.

The trouble is, however, that if you trace the cost of an average article right back to the raw materials from which it came—to the lump of iron ore in the ground, for example—you will find that something like three-quarters of the price you pay for the finished product represents the labor that went into it. So if the cost of that labor goes up, the price of the article is bound to go up accordingly. It's just as simple as that.

Something is bound to bust

That is why you can't freeze prices without freezing wages . . . why you can't freeze wages without freezing prices . . . and why you can't freeze either of them very long, in my opinion, if the Government is going to go on pumping the equivalent of printing press money into our economy. To put our faith in price controls while we continue to inflate our money supply is a good deal like plugging up the safety valve on a steam boiler, and then piling on more fuel. Something, somewhere, is just naturally bound to go bust sometime.

For a little while, of course, controls do bring the illusion of price stability, because the system acts as a device for squeezing profits. But that is precisely why "stabilization" has never worked in any country at any time in recorded history. It has been tried on this earth for more than 4,000 years, and in every case—so far as I can discover—the result has been the same: Controls have discouraged production, created shortages and aggravated the very conditions they were intended to cure.

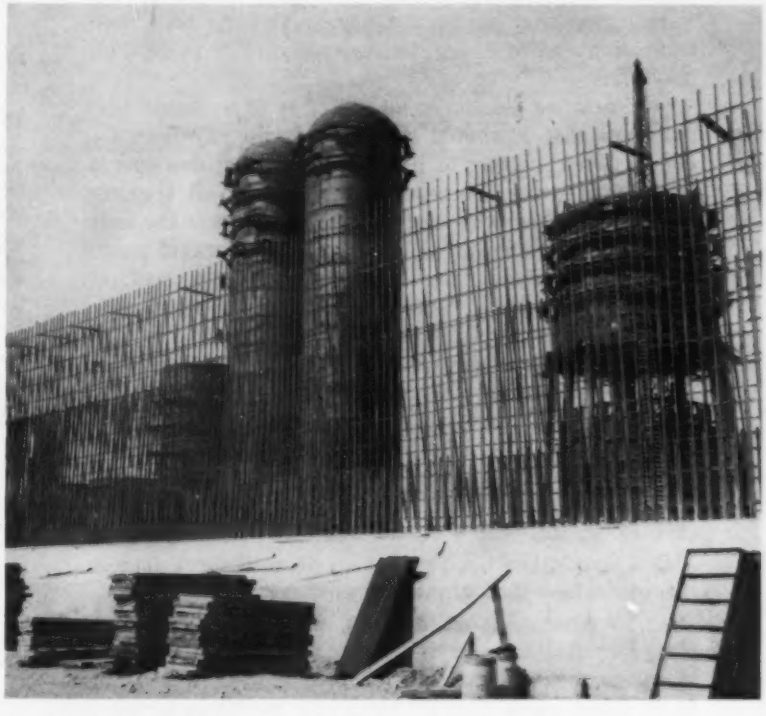
So I think it's time we took a good look at a few simple, fundamental economic facts:

No matter how much money the people of our nation have, it is obvious that they cannot buy more goods and services unless they produce more goods and services. Whenever output is increased—either through the workers' efforts or because of the more efficient tools which have been provided by investors—new wealth is created. Workers, customers and investors may all share in that new wealth; and the workers, being the largest segment of the economy, receive the greatest benefit either in higher wages, lower prices or both. It can be a higher wage without increases in prices; or it can be lower prices at the same wage, but either way the worker's purchasing power goes up and so does his standard of living. Indeed that is the way America became great.

But when wages go up beyond the level of the full increase in this new wealth, they can only be paid by boosting prices. So the cost of living shoots up, eats into the worker's pay raise, and he finds in the end that all he got was some very pretty money that felt mighty nice in his pocket but that didn't buy the things he thought it would.

When we hear people talking about who is responsible for the constant rise in prices, therefore, I think we have to recognize the fact that if wages had not risen so much more than production has, we would not have seen our great wage-price spiral. But Labor has refused to accept any such economic limits on its earnings, and if we check on what has happened throughout manufacturing industries in general, since 1939, here is what we find:

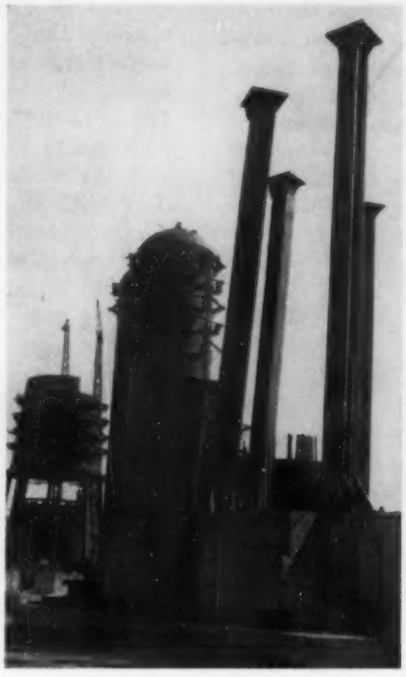
The man-hour output of labor has gone up 25 per cent; but hourly earnings have gone up 149 per cent—or about six times as much. So the cost of the labor that goes into the finished manufactured product has



"A 34 pct drop in the amount left to be plowed back into the business . . ." Behind a wall of reinforcing bars No. 1 blast furnace of Fairless Works rises in the background.

risen enormously and has wiped out a considerable part of the pay increases in the last eleven years. In the face of this situation, therefore, Labor leaders have taken the position that wage rates must rise at least as much as the cost of living.

With that point of view, I confess, I have had a good deal of sympathy. No one, I think, wants to see the living standard of the American workman go down as long as that can possibly be prevented. I recognize, of course, that —under prevailing economic conditions—Labor is maintaining its standard of living at the expense of less fortunate groups who depend, for survival, upon fixed incomes like pensions or the return from invested savings. But the right of one economic group to enrich itself at the expense of another is a question of morality which I shall leave to men who are better qualified than I to discuss its spiritual aspects. For my purposes tonight, the important fact is that Labor has possessed the economic and the political power necessary to enforce its demands, and it has used that power not merely to keep pace with the rising cost of living, but to exceed it by more than one-third.



"'Stabilization' has never worked in any country at any time . . ." Stoves for the No. 1 furnace at Fairless works, now being erected by U. S. Steel at Morrisville, Pa.

And now, as I understand it, Labor is trying to persuade us that it should really have two pay boosts—one to cover the cost of living, and another one on top of that to cover increased production. Well that, to me, is just plain economic doubletalk, because the only practical result, as far as I can see, will be wages pushing prices up, and prices pushing wages up until, at last, we shall have "stabilized" ourselves right into national bankruptcy.

For all these reasons, therefore, I believe that any further increase in steel wages at this time will only result in an increase in the cost of living . . . that, in the long run, it will be of no benefit to the workers themselves, and that it will contribute definitely to the inflationary spiral which is a matter of mounting concern to all the people of our nation.

But should the Union position prevail, there is just one more fact that you ought to know:

An increase of one cent in the basic wage of our employes would mean an increase of more than ten million dollars a year in the total employment costs of U. S. Steel alone. Beyond that, our recent experience has taught us that for every additional dollar we pay for labor, we will be compelled to pay another extra dollar for goods and services as the spiral reaches our suppliers. So for every cent that the basic wage of our workers is now boosted, we must add twenty million dollars to the price of the products we sell. That is the simple, unqualified mathematics of the case.

Whether our workers are to get a raise, and how much it will be if they do, is a matter which probably cannot be determined by collective bargaining, and will apparently have to be decided finally in Washington. It is a question which involves the basic anti-inflation program of our Government, and one which will clearly affect our entire economy. It will be viewed from many angles by many different people; and many widely-divergent opinions will be voiced concerning it.

I do not claim to know all the answers. I do not say that my views are the only correct ones... that they are right and holy, and that any opposing view is wrong and sinful. Nor do I believe that this problem constitutes a grave national crisis, unless, of course, it is permitted to paralyze the production of steel or the necessary expansion of the industry.

But I do believe that it is an important problem, and that our people have a right to expect that the facts will be presented to them truthfully. They have a right to expect, moreover, that the issues involved will be weighed in a reasonable manner by reasonable men with due consideration for our present national necessities and with a proper regard for the long-range needs of all of the parties concerned.

"Let's keep bargaining honest"

Certainly these parties will perform no service—either to themselves or to the country—by seeking to deceive the public, by resorting to recrimination, or by calling each other a lot of economically-dirty names. So, as the bargaining goes on, let's keep it honest. Let's be honest with each other, and especially with ourselves—like the Indiana farmer who went to market to sell his grain. When he got home, his wife asked him how he had made out.

"Well," he told her, "I didn't get as much as I expected; but then, I hardly expected that I would."

Now there was an honest man!

Again, I thank you.

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STRUCTURALS: Favor Metals Growth

Steel, aluminum expansion programs to get all structurals they need for first quarter '51, NPA pledges . . . Demand is double the supply . . . To meet AEC needs, slow shipbuilding.

Steel and aluminum expansion programs will get all the structural steel they need during first quarter 1952.

This was the promise of National Production Authority as it announced structural steel allocations for claimant agencies. Individual tonnage allotments were expected to be issued this week.

Steel expansion got only about 51 pct of needs for the fourth quarter, although aluminum requirements were nearly met.

Deputy NPA Administrator Ralph Trigg said that the individual tonnage allotments would also "provide a high percentage of needs for other important expansion programs."

Double the Supply—Filed requirements, it is explained, again were more than double the estimated supply. With preferential treatment necessarily given to expansion programs, this means that for the most part a large number of applicants will get far less than half of their screened needs.

Total structural steel authorized for first quarter construction is roughly 900,000 tons out of an estimated supply of 1,425,000 tons. Fourth quarter authorizations amounted to 890,000 tons out of 1,300,000 tons.

The remaining 525,000 tons of structural steel will be allocated for freight cars and similar non-construction uses.

Atomic Energy Commission needs will also be met in full, while Defense Dept. and NPA's aircraft division will each get 89 pct of requirements. Most major claimants will get percentages ranging from 4 pct (NPA's building materials division) to 60-80 pct for such programs as defense power, electronics, and so on.

Ship Building—Allocations for the Maritime Administration were at about fourth quarter levels of 51 pct, which means that considerable ship construction will have to be deferred.

Also disappointed was the Bureau of Public Roads. Its first quarter authorization was less than for fourth quarter, and represented only 28 pct of stated requirements. This meant deferral of new road projects with accent on maintenance operations.

Reserves set aside for self-certification, NPA said, should be adequate to support a reasonably high level of private residential construction. Tonnages allotted to Housing & Home Finance Agency, it was figured, would permit work to go ahead on 95,000 public housing units already started as well as on 45,000 multi-family units also started. Most new starts would have to be delayed.

First Quarter 1952 Allotments of Structural Steel (In Tons)
Delegate Agencies

Program	Needs	Allotment	Pct.
Dept. of Agriculture	45,962	4,000	8.7
Dept. of the Army (Domestic Construction)	16,916	13,000	76.9
Atomic Energy Commission	36,534	36,500	99.9
Civil Aeronautics Adm.	17,386	5,400	31.1
Dept. of Defense	192,364	171,000	88.9
Defense Electric Power Adm.	185,376	143,000	77.1
Defense Fisheries	300	90	30.0
Defense Minerals Adm.	18,536	15,000	80.9
Defense Solid Fuels (Coke Ovens)	5,600	4,500	80.4
Defense Solid Fuels (Coal Mines)	5,300	4,000	75.5
Defense Transport Adm.	45,000	22,000	48.9
Federal Civil Defense Adm.	1,900	565	29.7
General Services Adm.	7,636	5,000	65.5
Housing & Home Finance Agency	19,690	10,500	53.3
Dept. of the Interior	1,815	1,459	80.4
Maritime Administration	33,238	17,000	51.1
OIT and ECA	49,053	24,000	48.9
Petroleum Adm. for Defense	71,905	55,000	76.5
Bureau of Public Roads	179,127	50,000	27.9
Veterans Administration	7,548	5,472	72.5
Federal Security Agency			
Schools	47,382	22,800	48.1
Hospitals	26,366	15,504	58.8
NPA Divisions			
Agr. Mach. & Impl. Division	24,995	16,000	64.0
Aircraft Division	9	8	88.9
Aluminum & Magnesium Div.	none	—	—
Building Materials Div.	113,304	4,560	4.0
Canadian Div.	76,228	58,000	76.1
Chemical Div.	none	—	—
Communications Div.	6,054	4,100	67.7
Construction Machinery Div.	82,275	30,000	36.5
Consumer Durable Goods Div.	3,837	910	23.7
Containers & Packaging Div.	none	—	—
Copper Div.	none	—	—
Electrical Equipment Div.	13,509	4,560	33.8
Electronics Div.	418	91	21.8
Engine & Turbine Div.	38,470	37,000	96.2
Facilities & Construction Bureau	571,949	360,000	62.9
General Components Div.	none	—	—
General Indust. Equip. Div.	82,163	70,000	85.2
Iron & Steel Division	68,000	36,000	52.9
Leather & Leather Products Div.	none	—	—
Lumber & Wood Products Div.	303	274	90.4
Metalworking Mach. & Equip. Div.	45,965	32,500	70.7
Mining Mach. & Equip. Div.	15,070	13,000	86.3
Misc. Metals & Minerals Div.	none	—	—
Motion Picture-Photo Products Div.	336	91	27.1
Motor Vehicles Div.	16,946	15,000	88.5
Ordnance & Shipbuilding Div.	25,070	13,000	51.9
Printing & Publishing Div.	1,298	1,000	77.0
Pulp, Paper & Paperboard Div.	none	—	—
Railroad Equipment Div.	279,490	170,000	60.8
Rubber Division	175	175	100.0
Scientific & Technical Equip. Div.	936	410	43.8
Service Equip. Division	881	690	78.3
Textile Div.	none	—	—
Tin, Lead & Zinc Div.	none	—	—
Water Resources Div.	20,888	9,000	43.1
Reserves		21,800	
MRO, Self-Certification, Field Cases, Small Users			

DRUM HANDLER: New Yale & Towne Mfg. Co. permits any industrial fork truck to handle drums. No mechanical or hydraulic connections are needed.

See page 56 for Construction Steel News.

CMP: Hard Goods Metals Rations Dip

Civilian items classed as essential, non-essential . . . Will get a little less steel, much less copper, aluminum . . . Some firms hit hard . . . Push contract clinics—*By A. K. Rannells.*

Manufacturers of consumer goods will get slightly less steel and greatly reduced allotments of copper and aluminum during first-half 1952. How much less copper and aluminum will depend on the nature of the products involved.

Changes in the method of controlled-materials allocations for consumer goods went into effect this week with announcement of first quarter allotments. These changes were necessary, DPA Chief Manly Fleischmann says, in order to give many manufacturers "a fighting chance for survival" under metals scarcities.

Previously, allocations have been made on a basis generally of about 58 pct of base period use of steel, about 50 pct for copper, and 46 pct for aluminum.

New Groups—Under the new rule, consumer goods industries are split into 2 classifications—the "essential" and the "less essential."

For the essential category, allotments are made across the board on a basis of 50 pct of base period steel, 35 pct of copper, and 35 pct of aluminum. Typical products in this class include refrigerators, cooking stoves, pins and fasteners, and office supplies.

Less essential goods are allotted materials on a basis of 50 pct for steel, same as for essential goods, but copper allotments are cut back to 10 pct, and aluminum to 20 pct. Typical of this group are toys, costume jewelry, window blinds, ash trays, personal articles and so on.

Change does not apply to automobiles, which are regulated under a separate order, nor to small groups of consumer goods produced chiefly for health, safety, and welfare uses.

Try to Help—It is admitted that this latest cutback may well bring some manufacturers to the verge of shutdowns or in some cases even business failure. But National Production Authority will consider supplemental applications for steel where manufacturers can use it as a substitute for either or both copper and aluminum.

The agency will also help with the so-called clinics, which are being programmed for at least 20 major cities. These are for the purpose of helping such manufacturers land contracts or orders for defense items which can be made in their plants. Materials would be supplied by the contracting agency.

This change in the method of allotment was discussed with industry advisory committees representing many of the affected products before it was issued, NPA said. Officials say these groups agreed that it is better to make minimum allotments than to impose a virtual death sentence.

Some Chance—This way, it was said, there is some chance of survival during the big pinch which will last for at least 6 months. Both steel and aluminum are expected to be in much better availability by the third quarter. No hope for better copper supplies is held out.

"From now on you tell 'em when the specs are changed."

NPA will also lend an ear to appeals from industries which believe they are improperly classified, Fleischmann says. If justification can be definitely shown, switch will be made.

Further conservation orders are being drawn which will further curtail use of copper and aluminum for other than the most essential functional purposes.

Molybdenum Export Quota Set

Export quota for molybdenum for the fourth quarter has been set by the Office of International Trade at 1,589,000 lb of contained molybdenum. An additional 10,000 lb in the form of metal, wire, and scrap will be permitted. Wire exports will be limited to 1500 lb.

Breakdown of the over-all exports is expected to be roughly 1,463,000 lb of ores and concentrates, and acids and salts with the remainder of 126,000 lb in ferromolybdenum.

DMPA Tries for Zinc Stock Boost

Defense Materials Procurement Agency soon will announce a plan for increasing the supply of domestic and foreign zinc, a DMPA official told zinc industry representatives recently.

Zinc industry spokesmen who participated in the discussion comprised the first DMPA industry advisory committee to meet with agency officials in Washington.

Industry Controls This Week:

OPS Orders

CPR 93—Sets ceiling prices for construction and related services and sales.

CPR 94—Establishes a depreciation schedule for used car prices.

CPR 96—Antimony ceiling prices.

NPA Orders

M-16, Dir. 1—Permits authorized copper buyers to obtain supplies in advance of monthly CMP allocations.

M-79, Amend.—Removes five groups of maintenance, operating and repair supplies from the list entitled to receive priority aid in procurement for export.

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¶ How to prepare aluminum for spot welding? *See page 10.*

¶ How to prepare aluminum for painting? *See page 15.*

¶ How to clean aluminum before and after heat treating? *See page 20.*

¶ How to strip paint from aluminum? *See page 22.*

¶ How to clean magnesium? *See page 27.*

¶ How to select and install cleaning tanks, rinse tanks, and spray-washing machines? *See pages 31 to 35.*

¶ How to treat water in paint spray booths? *See page 36.*

¶ How to clean engine test cells? *See page 40.*

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Construction:

New CPR to push up construction costs . . . Adds rises, gives mark-up.

Regulation of prices for construction and related services and sales are covered by a new pricing order (CPR 93, effective Nov. 20) setting the profit markup at 90 pct of the highest amount the seller had in effect between July 1, 1949, and June 24, 1950.

Ceiling prices now will include current costs for labor, materials, and equipment, plus the 90 pct markup. In drafting CPR 93, OPS officials noted that costs of construction labor and building materials have risen by 10 and 12 pct, respectively, since June, 1950.

What's Covered—The order covers transactions involving the furnishing of labor service or any combination of labor, materials, equipment, and service for building, highway, and railroad construction, heavy construction, and much miscellaneous construction.

Sales of construction services under lump sum, cost-plus, fixed fee, cost-plus-fixed-fee, and cost-plus with guaranteed limit contracts are governed by CPR 93. Also covered are sales on a time and materials basis or an hourly rate basis, and sales of items or materials and equipment together with construction services required to install them.

Industry Fears Tinplate Shutdown

Shutdown of many tinplate plants and other production disruptions are threatened if National Production Authority goes through with its present intention of further reducing first quarter allocations of tin.

This is the reaction of the tinplate industry advisory committee to the announcement by NPA that no more than 6000 tons of tin, perhaps only 5000, would be available for the industry during the first quarter.

Industry members say that their working minimum is 7755 tons. They are now producing for January shipment. Not having received allocations for first quarter, they

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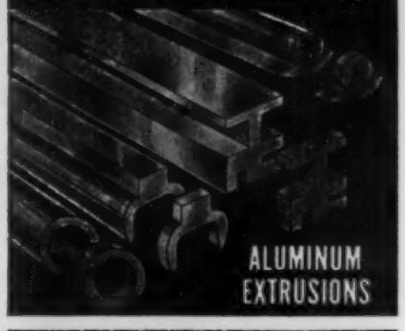

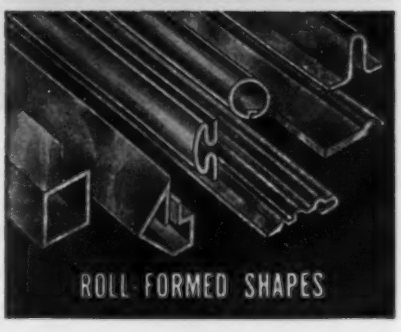

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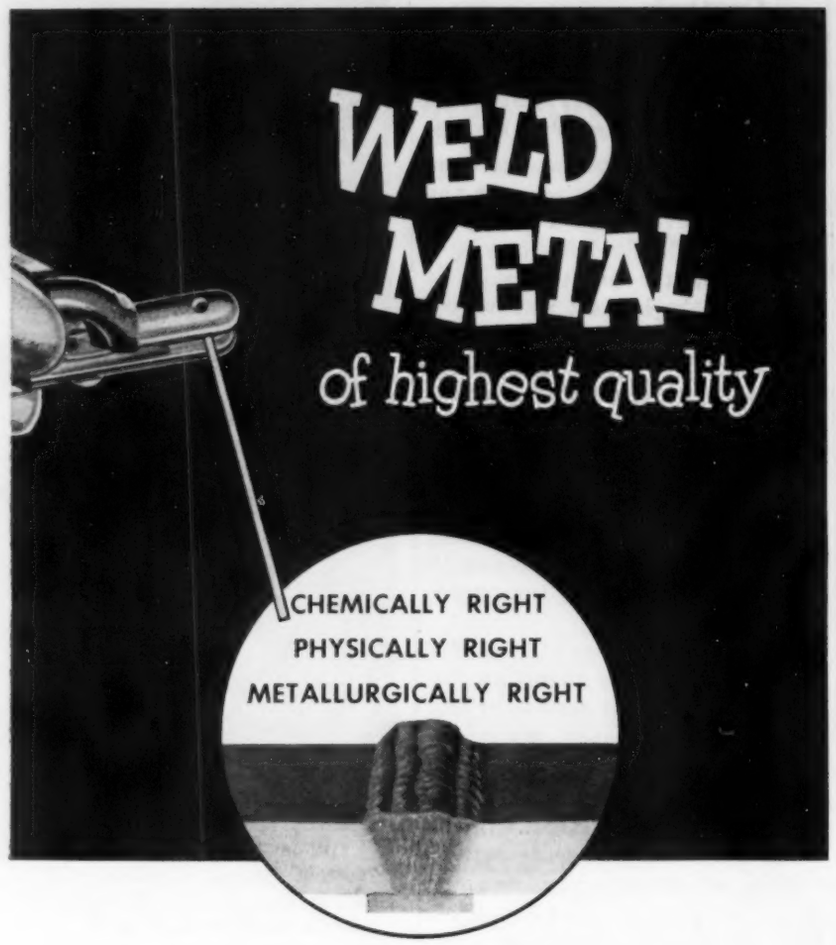

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had used their fourth-quarter quota figures as a basis for their first-quarter mix.

If they are now to be cut back by 20 to 30 pct, as NPA proposes, plants will have to close down while new schedules are arranged. Not only will this lose skilled workers to the industry but it will be impossible to get back to the necessary levels to meet spring and summer tin can needs for good packs.

Too Much Steel—Another move by NPA which the industry criticizes is that the agency has already issued CMP tickets for steel for tinplating purposes at fourth quarter levels before it had determined how much tin would be available. A third of the steel will lie idle.

At the moment, NPA sees no way out with respect to giving industry the tin it needs for the present first-quarter schedule. Tin imports have fallen to a dribble because of the tug-of-war over price.

There are only 11,340 tons of tin in the Reconstruction Finance Corp. warehouses, NPA says. Of this, only about 7500 tons is classified as Grade A. Moreover, Texas City's Longhorn smelter is producing only about 1600 tons a month.

Renegotiation Exemption Asked

Aluminum distributors have asked the government to be exempted from filing reports required by the Renegotiation Act of 1951. In a recent letter to the Renegotiation Board, the National Assn. of Aluminum Distributors claimed that it is virtually impossible for distributors to furnish the necessary records and reports.

Two or three dozen renegotiable contracts are a burden to a manufacturer. An aluminum distributor, the letter states, "will handle an average of 300 separate orders a day or 72,000 orders each year."

The new law requires records to be kept on all renegotiable sales, regardless of value. Segregation of renegotiable from non-renegotiable orders is, the association claims, an impossible task.

Revised Allotment Symbols

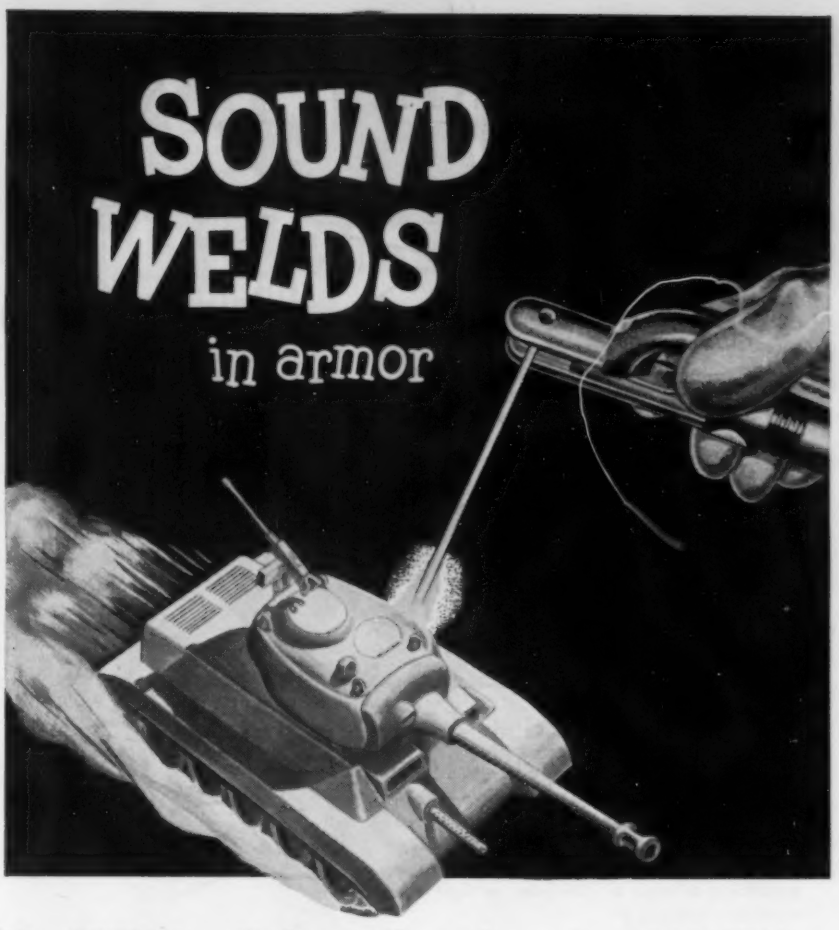
The following allotment and DO symbols and the programs to which they apply represent the latest revisions and changes to the list reprinted in THE IRON AGE, Oct. 25, 1951, p. 65,

CMP Allotment and/or DO Rating Symbol	*Major Program Involved*	*Agency or Industry Div., Etc.*
C-4	Certain munitions items being purchased by Foreign Govt's, through domestic commercial channels	Defense Dept.
C-5	Canadian military production program	Defense Dept.
E-0	Production Equipment for certain Private Contractors	Defense Dept.
E-2	Operations (Including MRO)	AEC
E-3	Privately-owned Facilities	AEC
H-4	Minor Requirements Including MRO Self-assigned (Order M-50)	Defense Elect. Power Admn.
H-6	MRO Self-assigned (Order M-78)	Defense Minerals Admn.
H-8	Other (Order M-87)	Defense Solid Fuels Admn.
W-3	Civilian Requirements of Foreign Areas Under Military Admn.	Defense Dept.
Y-7	All Programs (Voice of America)	State Dept.
U-9	Material for Repairs or Replacement of Supplies or Equipment due to Flood Conditions	(Direction 2 to CMP Reg. 5)
X-1	Laboratories	(Order M-71) Self-assigned
X-2	For Producers of Non-Controlled Materials for Use as Production Material	
X-3	Field Offices, Dept. of Commerce	
X-4	Material for Repair or Reconstruction of Buildings or Projects due to Flood Damage	(Direction 2 to Reg. 6)
X-5	To identify steel products purchased by (a) one steel producer from another (steel producer) or (b) one warehouse from another warehouse for resale without further conversion	
X-6	To identify: Brass Mill Products and Copper Wire Mill Products Required by Distributors to Replenish Stocks (Order M-82) and (Order M-86)	
Z-1	Priorities and Directives	
FC	To Transfer steel (a) between mills (b) from warehouse to mills in less than mill quantities for processing into another shape or form which is still a controlled material	

Lower Ceilings on Used Cars

An approximate 6 pct depreciation from the January, 1951, levels is effected for 1940-1950 models of used cars under terms of the new dollars-and-cents Ceiling Price Reg. 94.

Ceiling prices will be reduced at the rate of 2 pct every calendar quarter, beginning next Jan. 1, Office of Price Stabilization says. This depreciation rate is said to be in agreement with standard trade practice.



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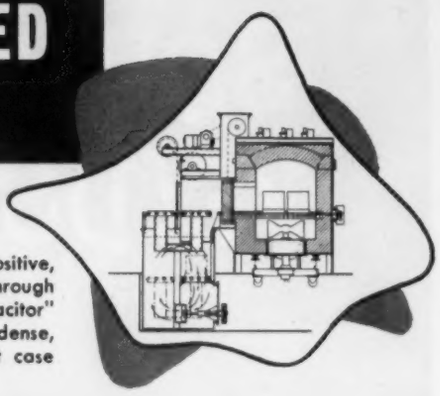

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Whether it's gas cyaniding, gas carburizing, clean hardening or carbon restoration work, the Dow Furnace is capable of processing a variety of parts having a wide range of heat treatments. To demonstrate the close tolerances of heat treatments, send us samples of your own parts for processing.

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Reductions in direct labor, material handling, machining and cleaning costs, coupled with improved quality, have resulted in savings amortizing the original cost of the Dow Furnace in a few months. Gas cyanides for ¼ to ⅓ the cost of liquid cyaniding.

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Brass Mills Hope for Quota Help

National Production Authority is telling brass mill operators that first-quarter 1952 allotments of controlled materials will be designed to help mills regain their historical positions.

Industry recommendation that no allowance be made for attrition is being studied by CMP officials. They are not saying whether they will agree to the suggestion.

As far as zinc supplies are concerned, NPA says it will make available to the industry during December about 15,000 tons. Industry spokesmen point out, however, that this tonnage still will not be sufficient to support production of the brass-mill products called for under programs.

O.K. Columbium & Tantalum Use

Columbium and tantalum may now be used in certain B products, including components of complete A assemblies. Permission was given by National Production Authority last week in an amendment to Sched. 5 to M-80.

Under the action, use of columbium or columbium-tantalum bearing steels is extended to B products for delivery for inclusion in defense or atomic energy DO rated orders. It also authorizes certification under the A-1 symbol when intended for the aircraft program.

Newport Tax Write-Off O.K.'d

Fast amortization has been approved for expansion of facilities by Newport Steel Corp. at Wilder, Ky., in the amount of $23,410,864.

Defense Production Administration says this sum represents 60 pct of the cost.

Get Copper in Advance

Brass and bronze foundries, wire mills and brass mills may now obtain copper supplies in advance of monthly CMP allocations.

Effective at once, Dir. 1 to M-16 permits those authorized to buy copper raw materials to place orders and take delivery on the first of each month up to 50 pct of the quantity authorized for use during the previous month.

Defense Contracts

Standard-Thomson Gets RFC Loan

Standard-Thomson Corp., Dayton, Ohio, manufacturers of metal products used in aircraft, automobiles, and other transportation units, has been awarded a $2 million Reconstruction Finance Corp. loan for construction of new facilities and purchase of machinery and equipment.

Defense Production Administration certified essentiality of the loan. About 75 pct of Standard-Thomson's work is performed on defense subcontracts let by aircraft builders.

The loan is to be paid off in 10 yrs, with interest set at 5 pct. Funds for Standard-Thomson formed the largest portion of three Defense Production Act loans totaling $2,336,000.

Central Buyer for Minesweepers

John Trumpy & Sons, Annapolis, Md., shipbuilders, will act as central procurement agent for six small business firms preparing to construct 30 minesweeping craft for the Navy.

Forty-eight companies bid for the contracts, complete value of which has been set at $5,455,800. In addition to the Annapolis firm, successful bidders were: Owens Yacht Co., Inc., Baltimore; Peterson Builders, Inc., Sturgeon Bay, Wis.; Simms Bros., Dorchester, Mass.; Sea Beaver Corp., Greenwich, Conn.; and Miami Shipbuilding Corp., Miami.

The vessels will be 57 ft, 3 in. long, with a beam of 15 ft, 4 in. and a displacement of 30 tons.

Moore Yards Start LSD Program

First of a series of four larger and faster landing ships, dock (LSDs), Hull No. 28, will be built for the Navy by Moore Drydock Co., San Francisco.

Moore will be lead yard for the program, performing design work and central procurement services for all four vessels. Contracts for construction of Hulls 29, 30, and 31 have not yet been awarded.

Over-all length of the LSDs will be 510 ft. Beam will be 84 ft, and displacement will be 6500 tons.

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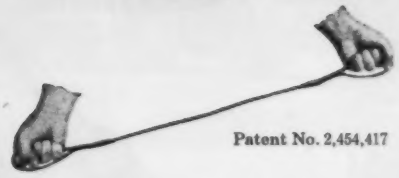

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Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address.

Forging press—1 ea, (exceeds $250,000), Loewy Construction Co., New York.

Machinery and equipment, $35,000, Ryan Aeronautical Co., San Diego.

Machinery and equipment, (exceeds $250,000), Niles-Bement-Pond Co., Chandler-Evans Divs., West Hartford, Conn.

Major components for radar training sets, 195 ea, (exceeds $250,000), General Electric Co., Syracuse, N. Y.

Special tools & ground handling equip., for F-84F airplanes, (exceeds $250,000), Republic Aviation Corp., Farmingdale, L. I., New York.

Repair parts for electrical control, 1130, $32,527, Detroit Lubricator Co., Detroit.

Repair parts for electric motors and generators, 11300, $103,437, Elliott Co., Crocker-Wheeler Div., Philadelphia.

Repair parts for engines, 1588, $116,880, Skinner Engine Co., Erie, Pa.

Repair parts for hydraulic machines, 12290, $74,561, Vickers, Inc., Detroit.

Repair parts for steam air condensers, 4288, $69,108, C. H. Wheeler Mfg. Co., Philadelphia.

Repair parts for log, shaft and draft systems, 15234, $145,450, Pitometer Log Corp., New York.

Repair parts for diesel engines, 23200, $96,775, The Union Diesel Engine Co., Oakland, Calif.

Repair parts for diesel engines, 48723, $131,470, Woodward Governor Co., Rockford, Ill.

Valves and repair parts, 3220, $39,257, Crane Co., Chicago.

Valves and repair parts, 13950, $105,377, Foster Engineering Co., Union, N. J.

Repair parts for turbines, gears, centrifugal and rotary pumps, (exceeds $250,000), Dravo Corp., Philadelphia.

Repair parts for gasoline engines, 11160, $28,772, Stewart-Warner Corp., Chicago.

Repair parts for electrical equip., 37935, $144,302, General Motors Corp., Detroit.

Repair parts for diesel engines, 15395, $128,424, The Auto Engine Wks., Inc., St. Paul, Minn.

Repair parts for pumps, $197, $179,517, Buffalo Pumps, Inc., Buffalo, N. Y.

Refrigeration unit, ea, $125,065, Amana Refrigeration Inc., Amana, Iowa.

Crane equip., ea, $161,992, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

Road grader equip., ea, $235,452, Rome Grader Corp., Rome, New York.

Road graders, ea, (exceeds $250,000), Bishop Manufacturing Co., Inc., Carlisle, Iowa.

Crane equip., ea, (exceeds $250,000), Thew Shovel Co., Lorain, Ohio.

Valves, gate composition, 27900 ea, $75,001, Hammond Brass Wks., Hammond, Indiana.

Life saving equip., (exceeds $250,000), Patten Co., Inc., Worcester, Mass.

Damper assy., (exceeds $250,000), Grumman Aircraft Engineering Corp., Bethpage, N. Y.

Adapters, socket wrench, bars, 115576, $92,941, Stevens Walden, Inc., Worcester, Mass.

Trucks, fork lift, 30, $100,336, Service Carter and Truck Corp., Albion, Mich.

Trucks, fork, electric, 30, $161,925, Automatic Transportation Co., Chicago.

Trucks, fork lift, 50, $215,750, The Ross Carrier Co., Benton Harbor, Mich.

Pumps, delivery & couplings, valves and spare parts, 40 ea, $225,712, Vickers Inc., Detroit.

Crane attachments, 429, $119,018, Western Iron & Foundry Co., Wichita, Kan.

Spare parts for 90 MM gun mount, (exceeds $250,000), Miller Printing Machinery Co., Pittsburgh.

Engine assys., 20, $56,000, Accurate Truck Parts Co., Chicago.

No. 4 LeBlond Broaching Machine, 10 ea, (exceeds $250,000), The R. K. LeBlond Machine Tool Co., Cincinnati.

No. 4 LeBlond Long Bore Machine, 25 ea, (exceeds $250,000), The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.

Control box, (exceeds $250,000), Automatic Mfg. Corp., Newark, N. J.

Defense Contracts

Transmitting set, (exceeds $250,000), Collins Radio Corp., Cedar Rapids, Iowa.

Receiver transmitter, (exceeds $250,000), Federal Tel. & Radio Corp., Clifton, N. J.

M1 rifles & spare parts, (exceeds $250,000), International Harvester Co., Evansville, Ind.

Spare parts for tractors, var, (exceeds $250,000), Caterpillar Tractor Co., Peoria, Ill.

Spare parts for tractor, var, (exceeds $250,000), R. G. LeTourneau, Inc., Peoria, Ill.

Cranes, revolving truckmounted, 43 ea, (exceeds $250,000), Bay City Shovels, Inc., Bay City, Mich.

Spare parts (their equip), var, $184,625, Caterpillar Tractor Co., Peoria, Ill.

Spare parts (their equip), var, $77,750, Waukesha Motor Co., Waukesha, Wisc.

Fuse, 1220000, (exceeds $250,000), Casco Products, Bridgeport, Conn.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation no. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q".)

Electrical parts, var, 52-162, Dec. 11.

Cartridge tank, steel, aluminum, 766000, 5595-0B, Dec. 10.

Steel cavity charge container, 10000,5595-0-B, Dec. 10.

Squared, machinists, 3310, 5560, Dec. 5

Lead thermocouple, 76500 ft., 154212 B, Nov. 29.

Channel reinforcing engine hatch, 250, 52-541B, Dec. 6.

Channel, reinforcing, w/s, 600, 52-541B, Dec. 6.

Channel, hold-down, 150, 52-541B, Dec. 6.

Channel, reinforcing, 250, 52-541B, Dec. 6.

Plate, floor, 1350, 52-541B, Dec. 6.

Plate, bearing, 50, 52-541B, Dec. 6.

Plate, seal, 100, 52-541B, Dec. 6.

Plate, adapter, 150, 52-541B, Dec. 6.

Sleeve, cylinder, 1200, 52-686B, Nov. 26.

Sleeve, cylinder, 7338823, 52-686B, Nov. 26.

Sleeve, engine, 2500, 52-686B, Nov. 26.

Piston, w/pin assy, 200, 52-686B, Nov. 26.

Pin, piston, 2000, 52-686B, Nov. 26.

Ring, set piston, 150, 52-686B, Nov. 26.

Rack, cargo body size, 760, 52-575B, Dec. 6.

Gate, tail, cargo dump body assy, 250, 52-575B, Dec. 6.

Pin, tailgate hinge and chain dump body assy, 1693, 52-575B, Dec. 6.

Pin, bumper roller, 20, 52-622B, Dec. 6.

Handle, wrecker body tool box, 180, 52-622B, Dec. 6.

Bolt "U" cab roof, 2000, 52-622B, Dec. 6.

Washer seat, 86, 52-622B, Dec. 6.

Trough, drip, 600, 52-554B, Dec. 6.

Valve, relief, 200, 52-554B, Dec. 6.

Chain, retaining, 10000, 52-554B, Dec. 6.

Cap, worm housing, 24, 52-663B, Dec. 6.

Carrier worm gear winch, 21, 52-663B, Dec. 6.

Collar, clutch shaft set, 144, 52-663B, Dec. 6.

Reinforcement, windshield, 25, 52-663B, Dec. 6.

Bolt "U", 39, 52-663B, Dec. 6.

Clip, spring, 251, 52-663B, Dec. 6.

Bolt, hook, winch, 270, 52-663B, Dec. 6.

Spring, cab, 246, 52-663B, Dec. 6.

Riser, cab seat assy, 70, 52-663B, Dec. 6.

Tube assy, winch roller, 210, 52-663B, Dec. 6.

Lever, winch, 175, 52-663B, Dec. 6.

Hinge, hood, 420, 52-663B, Dec. 6.

Chain, winch, 267, 52-663B, Dec. 6.

Shaft, propeller, 165, 52-585B, Dec. 6.

Drum, cam, 28 ea, (11-070-52-341B), Dec. 3.

Actuating slide, 28 ea, (11-070-52-341B), Dec. 3.

Spring, 2500 ea, (11-070-52-341B), Dec. 6.

Fuse, complete, 79100, (41-040-52-16), Nov. 26.

Heater gun feed mechanism, 1 itm, 52-311B, Nov. 28.

Regulator, 50 ea, 52-327B, Nov. 28.

Lathe, engine, 2 itm, 52-248Q, Nov. 26.

Motion picture projector parts, 48 itm, 52-5270Q, Nov. 29.

Level, engineer/military, 126 ea, Nov. 26.

Valve, check and gate, 200 ea, (ENG-23-065-52-341B), Nov. 26.

Valve, gate, 800 ea, (ENG-23-065-52-341B), Nov. 26.

HORSEPOWER Today— Not Horses

NEVER BEFORE in the history of the world has such power been available. Present day automotive engineering is producing means of transport of great capacity, speed and roadability. Hand in hand, Johnson Engineers have constantly improved and devised sleeve bearings to meet these greater demands. Much of today's greater power is paralleled by the 50 year's progress in Sleeve Bearings by Johnson Bronze.

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Zorball is an all-purpose, top-quality floor absorbent. In any shop, Zorball on the floor is your first step to prevent falls and fires which result from waste oils, paint and other liquids.

Unlike other floor absorbents, Zorball absorbs without breaking down. This increases its absorbing power, makes it easier to sweep up and safer to walk on.

Your Wyandotte Representative can prove to you in a few seconds that Zorball is a superior floor absorbent. Call him today for a demonstration.

P. S. If you have a cleaning problem, write Wyandotte for free technical information and service.

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Reduces fire hazards

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THE WYANDOTTE LINE — products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

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Construction

Steel Inquiries and Awards

Fabricated Steel Awards this week include the following:

185 **Tons,** Gorgas, Ala., steam plant water intake structure for Alabama Power Co., to Virginia Bridge Co., Birmingham.

100 **Tons,** Terrebone Parish, La., bridge, Louisiana Highway Commission, to Virginia Bridge Co., Birmingham.

100 **Tons,** Franklin County, Tennessee, bridge, Tennessee Highway Commission to Virginia Bridge Co., Birmingham.

Fabricated Steel Inquiries this week include the following:

278 **Tons,** Indiana County, Pa., construction of arch, base, and bridge, Pennsylvania Dept. of Highways, Harrisburg, Pa., Bids to November 21, 1951.

243 **Tons,** McKean County, Pa., construction of 1-beam bridge, Pennsylvania Dept. of Highways, Harrisburg, Pa., Bids to November 21, 1951.

130 **Tons,** Armstrong and Clarion Counties, Pa., repair and remodeling of bridge, Pennsylvania Dept. of Highways, Harrisburg, Pa., Bids to November 21, 1951.

Reinforcing Bar Awards this week include the following:

3000 **Tons,** Pittsburgh, Pittsburgh Parking Authority to Jones and Laughlin.

1500 **Tons,** Dubuque, Ia., Power Plant to Joseph Ryerson & Sons.

1200 **Tons,** Allenport, Pa., Pittsburgh Steel Hot Strip Mill, to U. S. Steel Supply Co.

400 **Tons,** Niagara Falls, N. Y., International Graphite and Electro Corp., To U. S. Steel Supply Co.

325 **Tons,** Dayton, propeller test, to U. S. Steel Supply Co.

260 **Tons,** Oak Park, Ill., Fenwick High School, to Olney J. Dean Co.

230 **Tons,** Hammond, Ind., Tank farm Wolf Creek, to Bethlehem Steel Co.

100 **Tons,** Chicago, relocation of C and NW track, O'Hare Field, to Calumet Steel Co.

Reinforcing Bar Inquiries this week include the following:

1125 **Tons,** Chicago, Beverly Calumet System contract 3A.

450 **Tons,** Northbrook, Ill., Harms Intercepting Sewer extension No. 2.

315 **Tons,** Chicago, Louis Weiss Memorial Hospital.

220 **Tons,** Erie, Ohio, General Supply Warehouse Ordnance Depot.

Building Costs at New High

American Appraisal Co.'s Construction Cost Index rose 5 points in the third quarter '51 to a new high of 536. Higher wages accounted for four points of the rise, and a 6 pct increase in freight rates added the other point.

Index applies to construction only and does not include fixtures or decorations. Costs for 1913 are used as a base of 100.

"Planners" Back Government Steel Mills

Seize on DPA estimates that defense takes half of nation's steel . . . DPA figures include strictly civilian output and are called "cockeyed" . . . Procurement probe—*By G. H. Baker.*

The case for government-built steel mills is being bolstered by contentions that defense production currently requires nearly half of the nation's entire output of carbon steel.

Advocates of government entrance into the steel business are rushing to lend support to this claim of the Defense Production Administration.

Cockeyed Percentage—The old familiar argument that expansion of productive capacity is always "too little, and too late" is being shored up by the new DPA figures.

Actually, the DPA figures which purport to show that mobilization demands can only be met by allocation of about 45 to 50 pct of all carbon steel are open to serious question. Informed industry sources state that the percentage is "cockeyed." Ten pct would be more like it, they maintain.

DPA, of course, includes everything but the kitchen sink in preparing its estimates. "Mobilization programs," the agency maintains, necessarily include the allocation figures for railway car builders, farm equipment manufacturers, power plants, and oil-country goods.

Civilian Industry—All of these "defense-supporting" industries, as DPA defines them, are engaged in production of civilian-type goods. Not one of them is occupied with production of strictly military items, such as tanks and guns. Some DPA officials state frankly that the defense-supporting industries "have nothing to holler about."

"They're getting a terrific break," one official states. "True, they're not all getting all the steel they'd like to have. But their normal rate of growth has been speeded up tremendously."

As a matter of fact, allocations of steel for some CMP programs is as much as 30 pct above the shipments for 1950. Steel for construction of schools and hospitals, despite the propaganda barrage to the contrary from some sources, is far ahead of the shipments anticipated by the claimants only a few months ago.

Integrated Growth—Coordinated programming of expansion programs moved forward last week with appointment of Samuel W. Anderson as head of the DPA Office of Aluminum.

DPA describes the move as another step leading toward complete integration of its expansion programs for production of controlled materials. Anderson will serve as expediter for the aluminum expansion program, working with James F. King, who now is in charge of over-all planning of resources expansion.

HE'S HAPPY?: Price Stabilizer Mike DiSalle told a press conference recently that prices of household and manufactured goods will probably go up in months to come.

Last Extension—Campaign for establishment of an integrated steel mill in New England is running short of time.

Extension of tax-amortization privileges until Jan. 11 by DPA last week may well be the final period of grace for the New England Development Corp. project.

Backers of the project originally sought rapid-amortization to the extent of $250 million. Later, this was pared down—at the government's request—to $228 million. Several extensions of time have been granted in recent months.

Procurement Probe—Major revision of government procurement policies may result from a forthcoming Senate investigation of wasteful federal buying habits.

Senate investigating subcommittee currently is laying groundwork for a full-scale probe slated to get under way soon after Congress reconvenes in January.

Facets of Inquiry — Investigation will cover, among other things, such subjects as duplicate buying, over-buying, conflicting practices among the departments and agencies, and other well-known weaknesses of the government's vast but creaky procurement system.

Procurement of civilian-type items will be featured in the investigation, but military practices also will get the magnifying-glass treatment. Several committee members are preparing recommendations which they say will result in "tremendous savings" to the Treasury.

Turn Page

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PENNSALT CHEMICALS

METAL CLEANING DIGEST

for men interested in Metal Cleaning Economies

U. S. STEEL REDUCES NUMBER OF BATHS, CUTS CLEANING COSTS ON GALVANIZING LINE

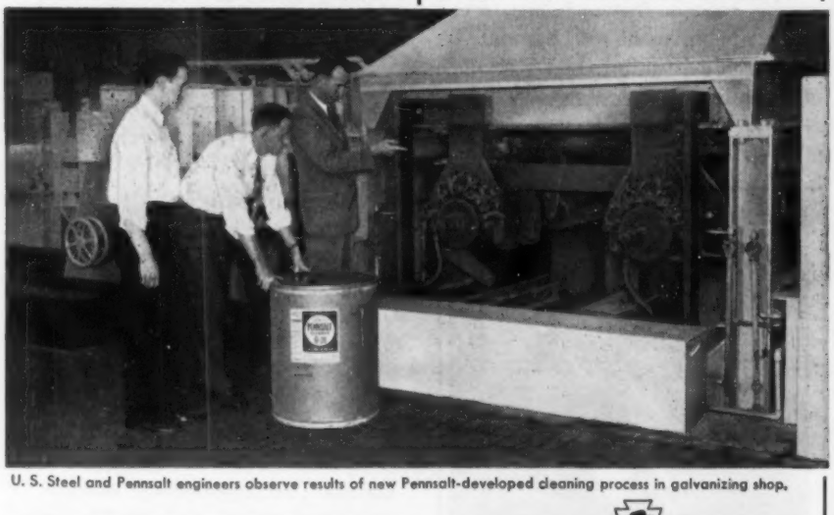
Early this year the Galvanizing Shop at the Irvin Works of the United States Steel Company faced a tough problem. They were asked to clean strip steel in their own tanks direct from the rolling mill, instead of having it pre-cleaned first on the tin mill's high-speed cleaning lines. This meant a new cleaning set-up . . . unless a special product could be developed for this job.

Pennsalt was called in, and a three-way team went to work on the problem. The Pennsalt fieldman, Pennsalt's Whitemarsh Research Laboratories and men from the Irvin Works pooled their knowledge and set about developing a new cleaning procedure.

This wasn't easy, because the galvanizing shop cleaning tanks hadn't been designed to do a double cleaning job. The first step, therefore, was to develop a special dual-purpose cleaner which would remove *two* types of soil.

Next the problem of cleaner strength was attacked. The new cleaner had to be strong enough to permit the use of the small capacity galvanizing line cleaning tanks, yet flexible enough to meet the multiple cleaning demands. Such a delicate ingredient balance could only be achieved by a *manufacturer* of basic chemicals, like Pennsalt.

Within one month from the date this unique cleaning problem came up, Pennsalt chemists made their recommendation and a test was arranged. They proved to be right on the very first try! Adherence tests proved conclusively that the cleaner was doing its job perfectly. In addition, the finished product came out of the galvanizing shop with more "shine". Rejects due to faulty cleaning were nil. Cleaning costs were significantly reduced and the tin mill cleaning tanks were released for other service.



U. S. Steel and Pennsalt engineers observe results of new Pennsalt-developed cleaning process in galvanizing shop.

Zinc Die Castings Now Free of "Blisters"

Clean, plate, lacquer, bake . . . that's the cycle used in making radio panels for two of America's leading automobile manufacturers. The panels are made from zinc-base die castings.

But the job platers had a tough time avoiding blisters after baking, caused by minute dirt particles or breaks on improperly cleaned parts.

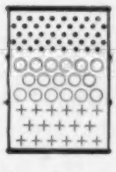
Then Pennsalt Cleaner Z-54 was tried. This cleaner is especially compounded for zinc-base die casting cleaning. Result—perfect, for all practical purposes. Average 0.1% cleaning rejects, and commendation from the automobile manufacturers for this highest quality work!

For Your Lab Notebook

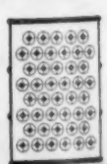
Why Pennsalt Alkaline Cleaners are Based on Fused Materials

Pennsalt alkalies for metal cleaners are prepared by an economical patented process that produces a *fused* homogeneous material. Fused alkalies will not segregate in drums—the alkali on the top of the drum is of the same balanced composition as the alkali at the bottom of the drum. Homogeneous composition also means fast, even dissolving of the alkali crystals—no rapid solution of caustic agents while phosphates or silicates drop to the tank bottom and dissolve slowly.

These fused alkalies are used as base materials for the various Pennsalt metal cleaners. Thus the user is assured of minimum alkali segregation, along with efficient, balanced bath composition. Pennsalt is a basic producer of metal cleaning alkalies—this means economies in manufacture which are passed on to the user.



This shows how the various ingredient particles of ordinary cleaners can shift and settle. (Exaggerated for clarity.)



Pennsalt Alkaline Cleaners are based on fused materials . . . ingredients are fused into homogeneous particles, which remain uniform throughout the drum.

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prior to .....
(Finishing method) (A)
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TOOLS: Navy to Release Reserves

Stockpiled Navy machine tools to be used for defense work . . . About 10,000 tools of 47,000 remain . . . Navy revises figures given to Iron Age . . . Plan survey—*By R. M. Stroupe.*

Unused items in its stock of reserve machine tools, the Navy says, are going to be placed in service to expedite the rearmament program.

According to latest Navy estimates, about 10,000 tool items of a former stock of approximately 47,000 are awaiting use. The department emphasizes that the 10,000 figure conveys a more accurate description of its available supply than its report to THE IRON AGE, Nov. 1, 1951, of "about 19,000 machine tools and 14,000 miscellaneous equipment items" remaining in storage.

More Machines—Army and Air Force contractors, now using 5000 Navy tools in filling defense orders, will have a chance at getting additional items to expedite their work. As a preliminary step, the Navy has prepared an inventory of reserve tools not required in current Navy programs.

A further survey will locate industrial plants leasing idle machine tools which can be put into operation by companies with immediate orders.

When the Korean crisis brought out a demand for greater aircraft production, the Navy turned over nearly all heavy forging equipment in its tool reserve to Air Force contractors. The department also worked closely with the Army to locate short-supply items required in the tank program.

To obtain lease of those tools still in Navy warehouses, contract holders may apply directly to agencies letting the contracts.

Johnson New Petroleum Chief

New appointee as Chief of the Office of Petroleum Programs, Munitions Board, is Air Force Brig. Gen. Alfred H. Johnson. The general will succeed Rear Adm. Burton Biggs, USN, on Jan. 1. A North Dakota native, Johnson is scheduled to hold the logistical post for 2 years, under current Defense Dept. policy. His predecessor was appointed to the position in 1949.

Plan Own R.R. for Alcoa Plant

Alcoa's projected $20 million reduction plant at Sandow, Tex., will be served by the firm's own railroad, if proposed sale of the road is approved by the Interstate Commerce Commission.

ICC has been asked to allow Alcoa to acquire control of the Rockdale, Sandow & Southern R. R. through purchase of all capital stock and bonds. Railroad extends from Marjorie to Sandow—about 7 miles.

Patents Board to Hold Hearings

Industrial concerns, associations, and individuals are going to get a chance to tell the Defense Dept. their views on patent policy and associated matters.

Hearing agency for the Defense Dept. is a new patent policy review board, headed by Rear Adm. C. M. Bolster, Chief of Naval Research. Other members are Maj. Gen. E. M. Brannon and Maj. Gen. R. C. Harmon, Judge Advocates General of the Army and Air Force, respectively.

Recommend Changes — These officers will review all phases of patent policy, including individual and organizational presentations. Subsequently, they will recommend to the military departmental secretaries any new patent policies or changes in policy believed to be in the best interests of the defense program.

Suggestions or problems for the board's attention should be typed or printed in quadruplicate and addressed to the Chairman, Patent Policy Review Board, Office of Naval Research, Dept. of the Navy, Washington 25, D. C.

"That was the wife. She said baby said his first word today—ferrosilicon."

Ebasco Studies Oil Shale Costs

Current industry-government hassle over probable cost of producing liquid fuels from shale and coal is headed for settlement on the basis of an independent engineering report.

Interior Dept. is contracting with Ebasco Services, Inc., New York, for audit and evaluation of coal costs.

National Petroleum Council recently completed a study on cost of producing liquid fuels from oil shale and coal. While NPC and government figures were in close agreement as to shale, NPC estimates on coal hydrogenation were substantially higher.

Auto Steel Plate Cut 40 Pct

Automotive manufacturers will have to get along in first quarter 1952 with only 60 pct of the steel plate necessary to meet their production schedules.

National Production Authority says it ordered the cutback because of "sudden changes in military requirements," and because allotments were found to be in excess of supplies.

Industrial Briefs

Sale Completed—NORTON CO. has sold its labeling machine business to the Standard-Knapp Div., Portland, Conn., of Emhart Mfg. Co. Conditions of the sale include the termination of all manufacture and selling of NORTON OSLUND Automatic Labeling Machines and the sale of this entire line.

Additional Funds—Stockholders of COLORADO FUEL & IRON CORP. at annual and special meetings held recently, voted to re-elect the board of directors for the coming year and to approve an extensive financing program. The financing plan approved is designed to provide approximately $27 million of additional funds to be used in the corporation's plant expansion and diversification program.

Completes 50th Year—ELLIOTT CO., Jeannette, Pa., recently marked its 50th year at a special meeting of the Elliott Veterans Assn. Nearly 300 veterans, ranging from 20 to 50 years of service, took part in the affair.

On Trial—An attempt to lengthen the life of railroad rails is being tried in the Central of Georgia's two tunnels at the Oak and Coosa mountains in the Birmingham district. A continuous rail obtained by welding standard 39-ft rails to form continuous sections which, in turn, are welded when laid on the road bed. The work is done by the OXWELD pressureweld machine method.

A Sale—Cleveland City Forge Co. has been sold to the SPENCER-HUGHES CO., of Cleveland. No major changes are expected.

To Increase Output—South Africa is going ahead with plans to raise its steel output still further and by the end of the year expects to be producing between 70 and 80 pct of her requirements.

Woodworking Addition — ACME STEEL CO. will construct a new $500,000 storage and woodworking building at its Riverdale, Ill., plant. It will free present storage areas for manufacturing operations and will contain 79,000 sq ft of floor space.

Set to Move — FENESTRA officials and employees in Los Angeles are getting ready to move into their new office and warehouse at 5026 East Slausson St. The new structure enables the combination of office and warehouse facilities, with room for a nominal increase of office space and expansion of the warehouse to twice its area when necessary.

Merger—John Merk Industries Inc., has merged into SCOTT RADIO LABORATORIES, INC., Chicago. Each Merk shareholder will receive 1.3 shares of Scott stock for each Merk share.

Benchmaster Builds—Site of the new BENCHMASTER MFG. CO. plant is in Gardena, Calif. The first unit will provide 20,000 sq ft of floor space on what will eventually be a 5-acre development.

Dealer Car Stocks Slip—Estimates by *Automotive News* place average U. S. new car dealer stocks at 7.4 cars per dealer. This compares with 8.4 a month ago and 8.3 on Oct. 1, 1950.

Establishes Awards—American SOCIETY FOR METALS has established three $2000 awards annually, to teachers of metallurgy in any school in the United States or Canada. The awards will go to those teachers of metallurgy whose performance and influence upon the general progress of the profession are judged best.

Concerted Effort—Engineering Manpower Commission of Engineers Joint Council has appointed over 40 local representatives in the United States and Canada, for the purpose of "beating the drum" for fullest industrial and military utilization of engineers, increased enrollment of students in engineering colleges, and fullest draft board consideration for this category of needed manpower.

Ready for Production—A $250,000 plant expansion for the EKSTROM CARLSON & CO., Rockford, Ill., is completed. Additional new equipment for machining and assembling their broad line of woodworking and metalworking machine tools is being installed in further preparation for increased production.

New Plant and Offices — PIPE & TUBULAR PRODUCTS, INC., has recently purchased and moved into their new plant located in Catasauqua, Pa. They have also moved into new business offices at 8504 Germantown Ave., Chestnut Hill, Pa.

Announcement — JAMISON STEEL CORP. has moved their warehouse and office to new and larger quarters at 280 San Bruno Ave., San Francisco.

Licensing Agreement — SHIELDED STUD WELDING CO., 124 W. Fourth St., Los Angeles, has announced a new licensing agreement for their process of inert gas stud welding. The only cost to the customer is a low monthly charge for the patented adaptor unit necessary in the process. Information as well as a copy of the agreement may be obtained by writing the firm.

Getting In Scrap — Salesmen of DRAKE STEEL SUPPLY CO. in the Pacific Coast area are cooperating with the American Steel Warehouse Assn. and the salvage division of the National Production Authority in a scrap drive.

New York Rep. — Onsrud Machine Works, Inc., manufacturers of high speed production wood and nonferrous metalworking machinery and equipment, has appointed BABCOCK MACHINERY CO. as its representative in the New York area.

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MACHINE SHOPS AT MESTA

Mesta is equipped to build the unusual. Unequalled plant facilities . . . the most modern machinery, including heavy duty lathes, grinders, boring mills, planers, draw-cut shapers, and gear hobbers . . . skilled workmen with long service records are all responsible for Mesta's ability to produce precision, heavy duty equipment.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

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Keller Asks Flexible Defense Plants

Chrysler chairman wants partial capacity plants . . . Move machines, not men . . . Effect of tool freeze order still in doubt . . . More ask to skip J.I.C. standards—*By W. G. Patton.*

Another approach to high defense production was spelled out at a press conference last week by K. T. Keller, chairman of the board of Chrysler Corp.

The Detroit Tank Arsenal, Keller pointed out, was originally built for five units per day. This was later expanded to ten tanks a day. The plant finally reached production of 40 tanks a day.

In order to reach 40-per-day production, Chrysler took over 2 million ft of floor space in its own plants and more than a million feet in suppliers' plants. Eventually, the machining processes for gun mounts, tracks and other components were picked up and put into progressive lines at Dodge, Chrysler and Plymouth. At peak production, 97 pct of the Tank Arsenal was used for subassembly and full assembly.

Flexible Production—At ten tanks per day, about 70 pct of the floor space at the Arsenal was devoted to making parts.

Keller's approach to the defense problem is substantially this: build a partial capacity plant. As defense production is stepped up, individual units can be picked up and carried back to other plants where space has been made available by cutbacks in civilian production. According to Keller, this makes a flexible production arrangement. The plan can be adopted without moving workmen, supervisors, and engineers all over the country.

Tooling Extensions?—It is still too early to determine the effect of the recent NPA order freezing machine tools. Major changes in the design of cars which require new machine tools cannot be made after Feb. 1, 1952. No new engine tooling programs may be started. However, tooling for several new passenger car engines scheduled for introduction in 1953 is already well advanced.

It is not known what the position of the government will be if, for example, 90 pct or better of the tooling for these engines is completed by Feb. 1, 1952. There's a good possibility these programs can still go on to completion, provided they don't clash head-on with tooling required for jet engines.

Switch to Defense—It appears that many builders of huge transfer-type machines will be hard hit by the government machine tool order. This is the type of equipment frequently used for engine blocks and heads. There are some exceptions but many builders of transfer equipment stopped accepting orders for anything but defense many months ago.

It is believed, however, that some machine tool builders may still be as high as 85 pct automotive. These firms will now have to switch to defense tooling.

An inevitable development by the recent government order will be (1) more subcontracting by machine tool builders, (2) more machine tool building by automotive firms.

Bypass Standards?—Another repercussion of the machine tool bottleneck is the growing number of requests for deviations from J.I.C. standards. These are the machine tool standards formulated by builders and users of machine tools. There have been benefits to both manufacturers and users from this standardization policy. Designed to standardize, among other things, such things as wiring and type of motor, J.I.C. has had a growing acceptance.

The pressure to obtain machine tool deliveries has naturally resulted in a number of requests for deviations. Even the standards governing painting of machines may fall before the growing pressure to deliver machine tools as fast as possible.

Spotty Production—Automobile production for the rest of this year will be spotty. In addition to interference by the weather, shortages of materials and possible supplier strikes, there will be production interruptions because of model changes and inventory-taking.

Despite interruptions, vehicle production during 1951 will undoubtedly be highly satisfactory in many respects.

Where Did GM Get Cash?

The mystery of how General Motors managed to pay cash wages to its employees during the Michigan bank holiday was explained by C. E. Wilson, GM chief. It was easy—the cash was "borrowed" from a grocery chain.

During the bank holiday all funds were frozen. Prospects for paying off several hundred thousand workers were dim. But at the same time the Kroger Grocery Co. was having a run on its stores.

Meyer Prentis, then treasurer of GM, asked if GM could take some of the Kroger cash off its hands. Kroger naturally said "yes" and the day was saved.

PREVIEW: Chrysler Shows Developments

Opens 1951 engineering exhibit in Detroit . . . Gimmick for good will . . . Show experimental hardtop car that develops 300 hp, lighter transmission, and magnesium die castings.

Giving the motorist a preview of its experimental engineering models may turn out to be one of the most effective goodwill builders yet devised by automakers.

At the Texas State Fair at Dallas recently, nearly 2 million visitors saw the 1950 Chrysler Engineering Exhibit that made such a hit in Detroit last fall. The 1951 Chrysler engineering display, unveiled in Detroit last week at a showing of 1952 model cars and an exhibit of Chrysler defense products, promises to be an even greater attraction.

Experimental Hardtop—Top exhibit at the Chrysler show at Detroit this year was an experimental "hardtop" model powered by a new K310 engine.

Other interesting exhibits include: (1) A new automatic transmission that is 56 lb lighter and has 42 pct fewer major parts than earlier designs, (2) recently developed braking mechanisms of booth cooled drum and disc type, (3) an experimental valve cast by the shell-mold process that save more than 150 operations per car, (4) an experimental all-aluminum radiator, (5) magnesium die castings in the 1952 cars which save 100 lb of weight, (6) a new electrical system that fires despite fouled plugs.

More than 50 separate exhibits are included in the display. Cutaway models and work-it-yourself exhibits are an interest attracter. An all-plastic model of a Plymouth engine shows every working part in color.

Cutaway Model — Also in the show is a cutaway, working model of one of 12 automatic transmission designs Chrysler has under test. Compressed air is used rather than oil to actuate the mechanism. For the first time, visitors can see all major parts in an automatic transmission in action.

A scale model of the experimental K310 was sent to Italy where custom car builders made the full size model and built the body. Wheelbase is 131 in. The car features European body lines. It has a very low center of gravity and is equipped with 18 in. wire wheels and disc brakes. K. T. Keller, Chrysler chairman, emphasized that the company has no immediate plans for bringing such a car into production.

The power plant for the experimental car is a modified Chrysler high compression V-8 engine. Equipped with 4 carburetors, new manifolding and exhaust systems and incorporating minor changes in the size of valves and ports, this engine will develop more than 300 hp operating on standard premium fuel with no supercharging, Chrysler officials say.

Unwise to Halt Auto Output

Complete shutdown of automaking facilities in the event of total war is unwise, according to a study made by Brookings Institution for Defense Transport Administration.

Brookings' argument runs: (1) Enemy destruction of vehicles might cripple transportation; (2) auto assembly lines could be diverted to light trucks, or other needed vehicles; (3) Detroit must make autos to replace those used by persons working in defense; (4) Mass transport systems need continuing help from the private auto fleet.

THE BULL OF THE WOODS — **By J. R. Williams**

CAN'T TH' FATHEADS TELL HE'S JUST PICKIN' UP A PAIR OF CALIPERS OR SUMP'N? WHY, IF HE WAS CAUGHT IN TH' MACHINE, IT WOULDN'T PULL HIM OVER, CUZ IT TURNS THIS WAY!
WELL, MAYBE THEY THINK HE WENT THRU UNDER IT ONCE--BUT NO, HE WOULDN'T BE THAT BULKY! NO, THERE'S NO TIME TO THINK!
11-23
J.R.WILLIAMS
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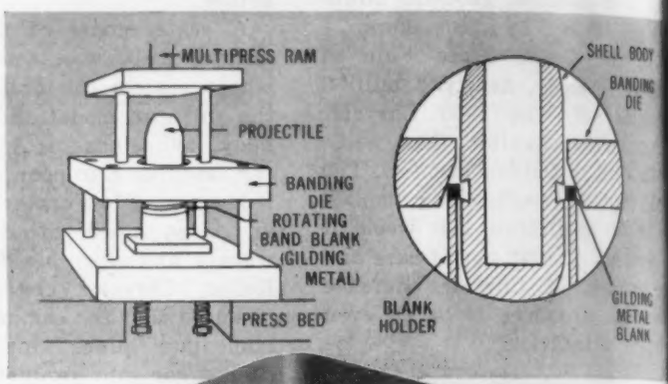

At speeds up to double those attained by other methods today, the Multipress at right brings new precision to shell-banding operations.

Combining its rapid, fully controlled "continuous squeeze" action with a tapered, solid die, Multipress assures uniform metal flow in contracting banding rings . . . reduces chance for metal fracture . . . eliminates work-hardening of metal . . . provides uniform radial pressures around the entire band . . . leaves no parting marks as dies are raised. In addition, the Multipress equipment requires less space than most other shell-banding equipment.

This new Multipress shell-banding process is applicable to projectiles of almost any size. Quick, easy tool changes adapt the press shown here to 20mm, 75mm, 76mm, 90mm, 105mm, 120mm and other shell sizes.

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Scrap Drive Pushed to Beat Winter

Western mills help rest of country . . . Test auto wrecks for smog . . . Utah steel fabrication booms . . . Foundry costs up . . . Small chance for more foundry coke—*By R. T. Reinhardt.*

Even though blizzards and cold waves affect scrap collections in only about half the producing areas of the seven western states, steelmakers here aren't leaving pre-winter scrap drives to the Midwest and East.

Knowing that allocations may direct any scrap they uncover out of their own plants, members of the Steel Industrial Scrap Mobilization Committee are nevertheless bringing out good tonnages.

Stocks Good—Western furnace operators generally have scrap inventories of from 30 to 45 days. Kaiser Steel Corp. at Fontana, Calif. is an exception. For the first time under the allocation system Kaiser is to get 6100 tons. Company had been out of the market for about a month and currently is down to 2 weeks' supply.

Last week San Francisco was the meeting place for two groups attempting to do something practical about scrap: Pacific Coast Conference of the Institute of Scrap Iron and Steel; and the western members of the Steel Scrap Mobilization Committee.

Scrap Institute members generally agreed that the present price schedule was satisfactory. However, Edward W. Greb, Director, Salvage Division, NPA, emphasized that this area should be producing more scrap cars.

Mobilization Committee members pledged that their salesmen would devote at least 1 day a week to scrap hunting.

Down to Cases—Auto Wreckers' Assn. in Los Angeles last week rolled out several of their old vintage jalopies for a demonstration and test for the Los Angeles County Air Pollution Control officials to see how much hand stripping of cars should be done before burning and how much this stripping would cost operators.

Gordon Larson, head of the anti-smog squad, told THE IRON AGE that he believes enough stripping could be done economically to eliminate much of the smoke.

Utah Fabrication Booms — Investment in Utah's steel fabricating industry has increased from $9,600,000 to almost $26 million in the past 10 years, according to a survey made by the University of Utah Economic and Business Review.

Number of steel consuming industries increased from 27 to 57; employment from 1500 to 3200; consumption of steel from 66,000 net tons (1940) to 228,000 net tons in 1950; and annual sales volume from $18,500,000 to $50,100,000.

Major market for a large part of the production is the inter-mountain West, although some products, notably mining machinery, are marketed on a world-wide basis.

Will I be able to back this machine on solid ground again? Will the banks cave in causing us to capsize?

Unbalanced Freeze — A principal gray iron foundry in Los Angeles has come up with some interesting figures on the increase in cost of operation which have developed since only last April.

Moulding costs, up 7 pct; core making up 9 pct; metals up 8 pct. Complaint is that sales prices are frozen and materials and labor costs are free.

Not All Gold—Last week's report that Columbia Steel Co. might be in a position to alleviate coke demand in the West with rebuilding of 23 ovens now seems a forlon projection of optimism. With all five blast furnaces at Geneva in operation, Columbia reports there is practically no immediate prospect of offering foundry grades of coke.

There is the encouraging prospect for foundries that by the first quarter next year there will be ample pig for all western foundry requirements. Foreign pig is finding it harder to locate buyers.

Aluminum "Decals" — Boeing Airplane Co. in Seattle has evolved an aluminum foil decalcomania for labeling anything from an airplane to a golf club.

Millions of these practically indestructible labels are being produced in Seattle by Boeing and the C. and H. Supply Co.

Reportedly the key to successful production and use of these "decals" is the method by which the .003-in. thick aluminum stock is processed so that it can be imprinted with lasting letters or figures. First a color retentive coating is placed on the surface of the foil by chemical reaction.

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MARVEL is also the only manufacturer of both metal sawing **machines** and metal sawing **blades.** Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

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Priority for Tool Orders From Europe

ECA machine tool expert says overseas orders, defense or not, will get priority ratings . . . Needed to offset M-41 . . . Bergstrom calls for big production hike—*By G. Elwers.*

Most foreign machine tool orders will receive priority ratings, whether or not they are for direct defense industries. This word was given machine tool builders at their recent convention by Charles Baker, ECA machine tool expert. This action was made necessary by the amendment of M-41 which eliminated the 30 pct ratio of machine tool production set aside for certain non-rated orders, including foreign.

The procedure, as outlined by Mr. Baker, is this: American machine tool builders holding foreign orders for machine tools must initiate the requests for ratings. The proper forms are filled out and sent to the embassy of the buyer's nation for authentication. The endorsed forms then go to the ECA or to the Dept. of Commerce's Office of International Trade, which sees that DO ratings are issued.

Maintain Assistance—Since most non-rated shipments will be cut off by the new amendment to M-41, the machine tool production distribution order, this agreement to rate most foreign orders was made so as not to disturb plans for U. S. machine tool assistance in European economic recovery.

Any machine tool builders who do not realize the enormity of the job the industry faces had their eyes opened by Swan E. Bergstrom, new head of the NPA's metalworking machinery division. Mr. Bergstrom told the builders' convention that an amount of machine tools greater than the present backlog will be ordered before July of next year.

Heavy Backlog—The current industry backlog stands at about $1.3 billion. Mr. Bergstrom said tools to be ordered by government and industry by the end of the fiscal year will amount to about $1.5 billion.

Since the present backlog represents about 2 years' production at current output rates, the need for greatly and rapidly increased machine tool production is evident. Mr. Bergstrom said the industry must double its present production rate, to an annual of $1.5 billion in the next 9 months.

Solution—Subcontracting is the answer, as Mr. Bergstrom and other convention speakers emphasized. NPA, Mr. Bergstrom said, is concentrating on expediting subcontracting. Meetings are being held with the advisory committees of industries which, due to materials cutbacks, might have the capacity to build machine tools. Among such groups are the makers of machinery for food processing, canning, textiles.

A survey of members of the National Machine Tool Builders' Assn., as yet incomplete, shows that already 15 pct of machine tool shipments is being produced by subcontractors. This is based on returns from 93 machine tool builders. This percentage must rise to 30 or 35 pct if the industry is to keep up with its job, the NPA estimates.

Assure Materials—Mr. Bergstrom gave the machine tool builders strong assurance that all needed materials for expanded production of machine tools would be made available. This has long been the policy of the NPA's metalworking division, but in the past this division has not been too fortunate in obtaining the necessary cooperation of the responsible NPA divisions and officials.

The feeling that the machine tool industry should get no special treatment prevailed in Washington for a long time. Only in recent months has this attitude been broken down and apparently dissipated.

Supplier Problem—A problem which has not been getting enough attention is the materials problems of suppliers to the machine tool industry. Copper shortages seriously limit the availability of motors and controls. Bearings are still hard to get.

This problem was pointed up recently by a firm which builds both machine tools and hydraulic equipment. The hydraulic equipment is used on many products, including machine tools. This firm reports it gets the materials it needs for its machine tool production, all right. But it is being cut on materials, particularly bronze, for its hydraulic pumps.

A lot of machine tools may be held up if this firm is unable to keep up its production of pumps. This firm is considering trying metallizing some other metal.

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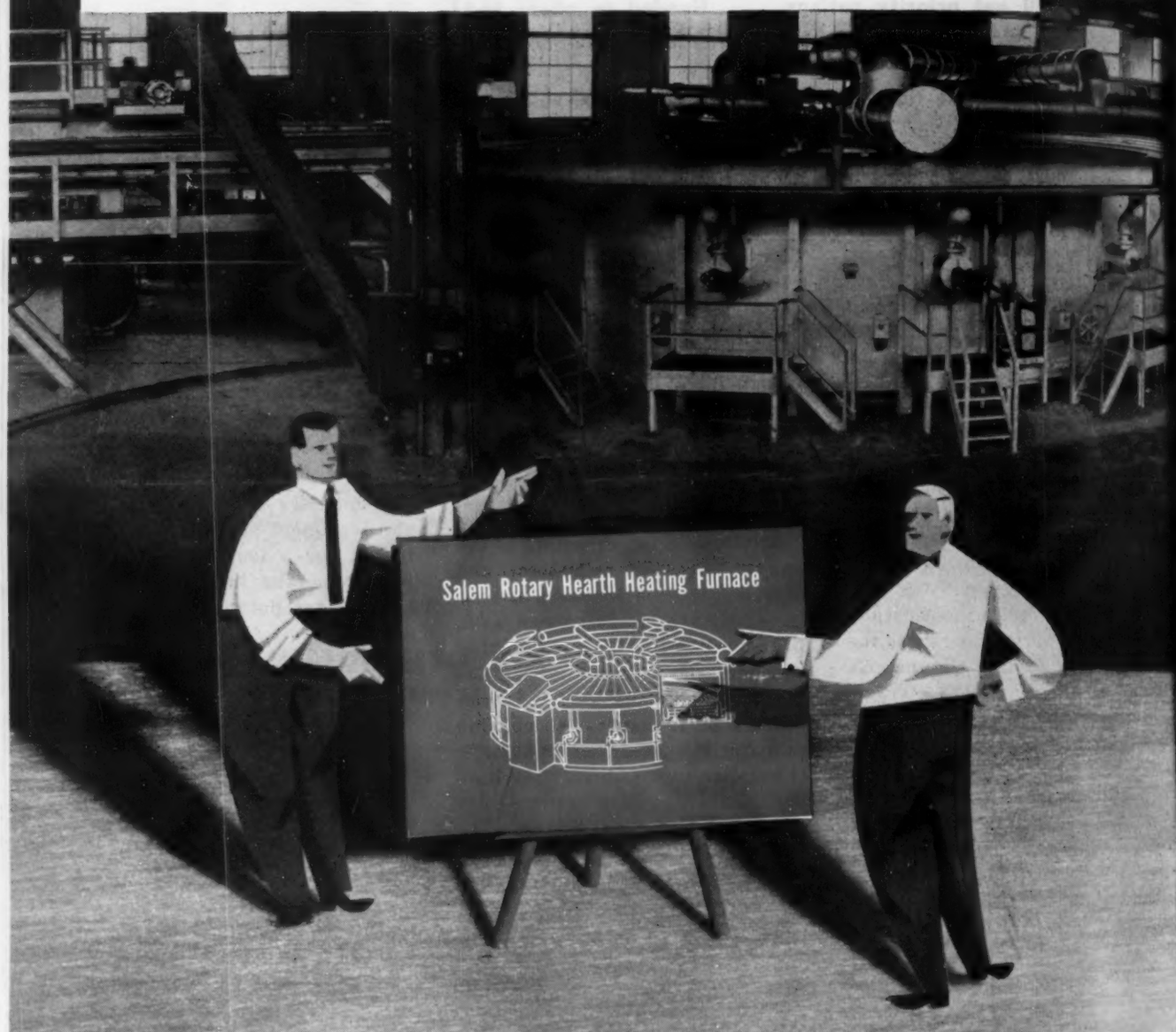

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The Iron Age

INTRODUCES

Don Bussey, named plant superintendent, Moss Landing, Calif., for KAISER ALUMINUM & CHEMICAL CORP. Mr. Bussey replaces **Doug Wilkins,** who was transferred to Permanente, as assistant to the works manager of chemical operations in California.

John B. Owen, promoted to the position of general manager of sales of the EDGCOMB STEEL CO., Philadelphia.

L. E. Osborne, named to the newly created post of executive vice-president-defense products, of WESTINGHOUSE ELECTRIC CORP., Pittsburgh. **Tom Turner** becomes vice-president in charge of manufacturing and labor relations. **W. B. Anderson,** named assistant to Mr. Osborne; **Frank L. Snyder,** manager of the Aviation Gas Turbine Div., Sharon, Pa.; **R. C. Bergvall,** manager of engineering, defense products; **B. M. Brown,** sales manager, defense products; **M. A. Dotterer,** manager of production, defense products.

Edward W. Sankey, elected vice-president and assistant to the president of the BAKER-RAULING CO., Cleveland. **John A. Matousek** was named vice-president in charge of manufacturing.

Joseph T. McNally, appointed sales agent, New York district sales office of the AMERICAN CAR & FOUNDRY CO. Mr. McNally will specialize in tank car and miscellaneous sales.

Dr. **Walther Mathesius,** joins the Freyn Engineering Department of KOPPERS CO., INC., in Chicago, as a consultant. Dr. Mathesius is retiring as president of Geneva Steel Co., effective Dec. 1.

Henry Lipsey, named manager of operations for AMERICAN METALLURGICAL PRODUCTS CO., Pittsburgh.

H. A. Williams, appointed manager, electronic components division, STACKPOLE CARBON CO., St. Marys, Pa.

James A. Miller, appointed manager of the newly-opened sales and engineering offices of the REEVES PULLEY CO. in Los Angeles. Mr. Miller's assistant is **Harlan M. Gillis.**

Harold W. Beder, Jr., appointed general sales manager of the WHITNEY CHAIN CO., Hartford, Conn.

Donald M. Mager, elected vice-president and comptroller and **William F. Lynne** as secretary and treasurer of the YORK CORP., York, Pa.

Harvey M. Snook, promoted to assistant comptroller of TENNESSEE COAL, IRON & RAILROAD CO., Birmingham. **James W. Porter** succeeds **Mr. Snook** as assistant comptroller, in charge of costs & statistics.

W. J. Langston, elected chairman of the board of directors of CANADA IRON FOUNDRIES LTD., and **T. F. Rahilly** was named president.

P. F. Lavedan, elected chairman of the board of directors of LIQUID CARBONIC CORP., Chicago. **K. P. Miller** and **J. P. Wright** were elected vice-presidents.

Joseph L. Mullin, appointed vice-president of Electro-Alloys Div. of AMERICAN BRAKE SHOE CO., New York. **Walter G. Hoffman** was appointed assistant to the vice-president for research and development of the parent company.

Turn Page

JONATHAN D. FREEZE, recently elected president and director of the Jessop Steel International Corp., New York.

W. A. BROWN, JR., recently elected president and general manager of the Liquid Carbonic Corp., Chicago.

WILLIAM M. BLACK, recently appointed president of Electro-Alloys Div., American Brake Shoe Co., New York.

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Personnel

Continued

A. H. Cowie, appointed vice-president, general manager and a director of the DOMINION BRIDGE CO., LTD., Quebec.

John J. Dowdle III, Bartley J. Fleming and **Willis P. Tuller,** named vice-presidents of GREAT LAKES CARBON CORP., New York.

William D. Roberts, appointed vice-president in charge of engineering and research for RYMAN ENGINEERING CO., Ellwood City, Pa.

Roger A. Kenman, named sales manager of the machine tool division of CHARLES H. BESLY & CO., Beloit. Wis.

J. H. Moore, Jr., named general district superintendent in charge of coke oven manufacture, by the HARBISON-WALKER REFRACTORIES CO. **Charles W. Ayers** was appointed superintendent of the silica plant at Windham, Ohio, and **William N. Bartleson** will be superintendent of the new plant at Warm Springs, Calif.

Jerry Reiling, appointed district manager for HYSTER CO. in Philadelphia-Baltimore area.

John J. Kelley, appointed district manager of sales by PITTSBURGH SCREW & BOLT CORP. in Detroit.

Leroy A. Van Bomel, elected to the board of directors of CHRYSLER CORP., Detroit.

D. R. Waugh, appointed general sales staff manager of COLUMBIA STEEL CO., San Francisco.

Harold E. Park, elected vice-president of the SHAW-PERKINS CO., Pittsburgh.

Charles T. Lewis, named chief lubrication engineer of REPUBLIC STEEL CORP. and is succeeded by **William E. Schnitgen** as the Warren district lubrication engineer. **Harry S. Jones,** promoted to the post of divisional superintendent of the tube mills at the Youngstown District plant. New superintendent of the continuous tube mills is **James McClintock** who succeeds Mr. Jones. **Edward Weden, Jr.,** has been appointed assistant superintendent of the continuous weld tube mill at Youngstown.

A. Bruce Mainwaring, appointed plant superintendent of UNIFORM TUBES, Collegeville, Pa.

W. TAYLOR-BAILEY, appointed president and managing director of the Dominion Bridge Co., Ltd., Quebec.

WILLIAM H. MYERS, named as general district superintendent in charge of six plants for Harbison-Walker Refractories Co., Pittsburgh.

LEONARD W. BUGHMAN, elected a vice-president of Great Lakes Carbon Corp., New York.

BOYD E. CASS, recently named manager of metallurgical sales for Foote Mineral Co., Philadelphia.

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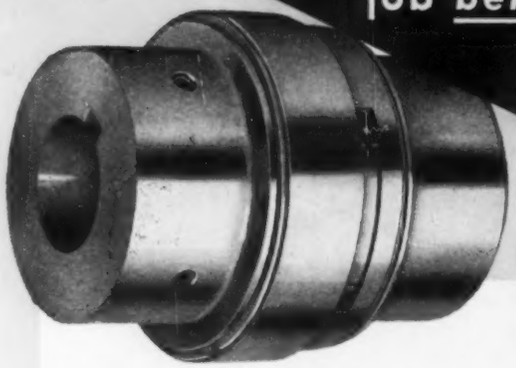

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Personnel

Continued

Charles S. Lang, elected treasurer and comptroller of EDGEWATER STEEL CO., Oakmont, Pa. **William F. Carey,** who had been treasurer of the company for the past 24 years has retired. **Orton L. Bowman,** elected assistant treasurer; **Edward T. Truschel,** assistant comptroller; and **Joseph W. Truschel,** auditor.

Frank E. Kyndberg, appointed district sales manager, Waukegan district of AMERICAN STEEL & WIRE CO.'s Cyclone Fence Div. **Arthur C. Correll** succeeds Mr. Kyndberg as Southeastern district sales manager with headquarters at Savannah. **A. R. Wyllie** was assigned to the sales organization of the division in Pittsburgh.

T. D. Meyer, appointed production engineer of the Abrasive & Wheel Div., NORTON BEHR-MANNING OVERSEAS, INC. **Gilbert H. Gidley** was appointed abrasive engineer in Chicago. **Gordon F. Colson,** resumes his full time activities as field engineer in the Chicago area.

William S. Rheem, named manager of the South Gate, Calif., plant of RHEEM MFG. CO. **Lloyd Simonson** was appointed manager, Sparrows Point, Md., plant and **Harry H. Filler** as manager of the Bayonne and Linden, N. J., plants.

Clarke A. Silcott, appointed general manager and **K. J. Flood** as manufacturing manager of the engine division of KAISER-FRAZER CORP., Willow Run, Mich.

Luis E. Eckelmann, elected vice-president of the PYRENE MFG. CO., Newark, N. J. Mr. Eckelmann will be in general charge of development work as well as of metal finishing.

Richard A. Biggs, became associated with the FRANKI FOUNDATION CO. and will be located in New York.

Dr. Donald W. Collier, appointed director of research for THOMAS A. EDISON, INC., West Orange, N. J.

A. J. Mallinckrodt, named chief engineer of the U. S. AIR CONDITIONING CORP., Minneapolis.

S. C. Lloyd, appointed sales manager of the pre-engineered division of MECHANICAL HANDLING SYSTEMS, INC., Detroit.

Jack Melton, appointed superintendent-materials of TEXAS ENGINEERING & MFG. CO., INC., Dallas.

The Iron Age
FOUNDED 1855
Technical Articles

CERAMIC COATINGS can save CRITICAL ALLOYS

by W. G. Hubbell
Chief metallurgist
Ryan Aeronautical Co.
San Diego

Even with sub-zero cold outside and 1800°F inside, ceramic coatings on aircraft exhaust headers resist impact. So far, only 19-9DL stainless has been enameled. The coated sample parts completed 1623 hr on trans-Pacific flights in good shape. Previously, deterioration generally set in after 650 hr.

Series of tests conducted by the Ryan Development Laboratories have shown that ceramic coatings will extend the life of 19-9DL stainless steel exhaust components at elevated temperatures encountered in aircraft service. No deterioration by oxidation, carbon absorption or corrosion attack was found in test periods running up to 1623 hr.

This extended life is important both for better service in exhaust systems and as a substantial aid in conserving critical materials in short supply. It means that the so-called "luxury" class of alloys can often be supplanted by cheaper alloys when coated with ceramics.

A thermal shock resistance test showed that the ceramic coating, Bureau of Standards No. A-417, is not affected by exhaust system service at any temperature between −75°F and 1700°F This test also indicated that the coating will stand a surprising amount of mechanical impact without damage.

To obtain the most useful test data, Ryan manufactured a number of exhaust system components, not only of ceramic coated 19-9DL but also of a variety of uncoated alloys. Arrangements were made with Pan American World Airways for these components to be used on Boeing 377 "Stratocruiser" aircraft engaged in trans-Pacific flights.

These planes were selected because they offered the best combination of factors for the experiments. Their four 3500 hp Pratt and Whitney engines are the largest piston-type engines in use on aircraft. Trans-Pacific flight runs develop maximum test hours within a specified time, due to the long distances flown.

The components chosen for these flight tests were "headers" which channel the hot gases from the cylinders to the collector ring. These are the hottest operating part of the exhaust system. The headers were removed from the engines at specified intervals, returned to Ryan for metallurgical examination and replaced on the engines for further flight experience.

Exhaust system service on large aircraft engines is considered to be one of the most torturous applications for corrosion-resistant alloys. These thin-walled structures must withstand continual blasts of high velocity exhaust gases, severe vibration, frigid atmospheric con-

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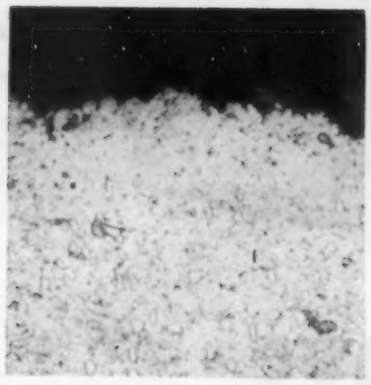

FIG. 1 — Interface between ceramic (black area) and 19-9DL, coated both sides. Interior hot zone, 650 hr service. Etched, Glyceregia. 250X.

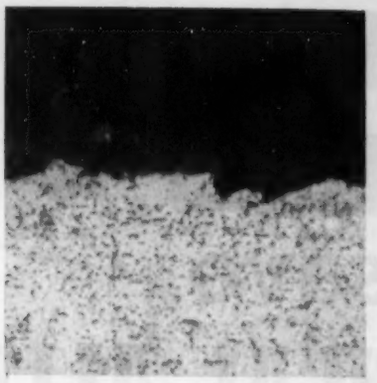

FIG. 2—Interface bond between interior ceramic coating and 19-9DL stainless header, untested. Note absence of decarburization. Etched, Glyceregia. 250X.

FIG. 3—Exterior, uncoated surface of 19-9DL stainless header, enameled on inside only. After 650 hr. Scaling is considerable. Etched, Glyceregia. 250X.

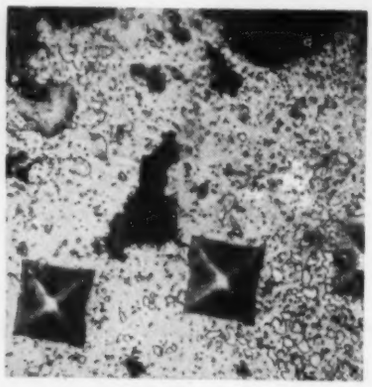

FIG. 4—Interior of 19-9DL, polished to test light etching zone hardness. Depth impressions, 0.0005 in. Hardness, 20.5 RC. 400X.

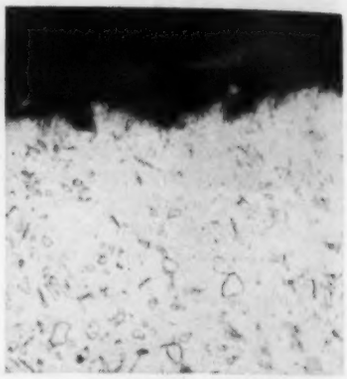

FIG. 5—Header made of type 310 stainless (with columbium) was in better condition than other uncoated specimens after 1368 hr. Etched, Glyceregia. 250X.

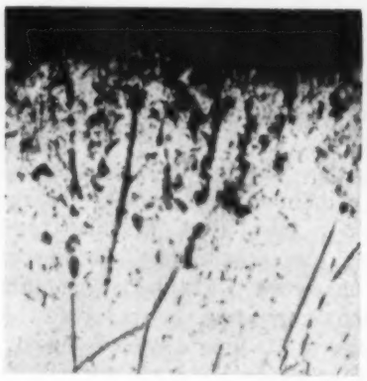

FIG. 6—Uncoated type 310 stainless (modified) shows progressive grain boundary penetration on interior, 1623 hr. Etched, Glyceregia. 250X.

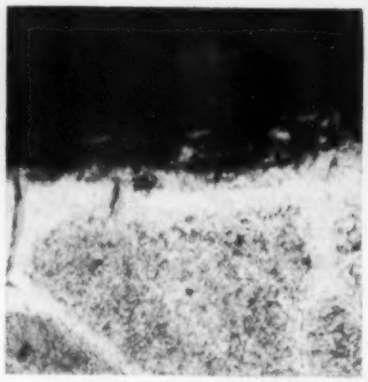

FIG. 7—Uncoated Inconel X header's interior surface displays intergranular penetration after 1385 hr service. Etched, Glyceregia. 250X.

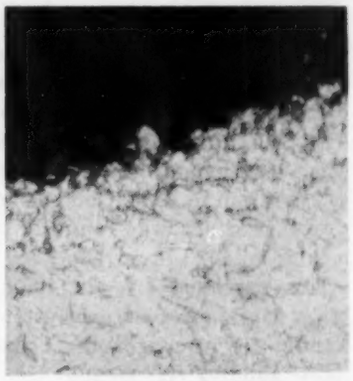

FIG. 8—Interior of uncoated Hastelloy C had extreme overage condition after 1234 hr., precipitation along grain boundaries. Etched, Glyceregia. 250X.

Ceramic coatings (continued)

ditions and operate for extended periods at temperatures as high as 1800°F.

For the tests, Ryan production departments fabricated exhaust headers of the materials shown in the accompanying box. The test samples were labeled with special nameplates. Composition of the alloys included in the investigations is given in the adjacent table.

Tests consisted of metallographic examinations, photomicrographs, spectrographic analyses, microhardness readings and dial gauge micrometer observations. Test headers were removed from the aircraft at intervals of approximately 650 hr, 1000 hr and between 1234

DETAILS OF EXHAUST HEADERS TESTED

19-9DL stainless steel, 0.043-in. thick, ceramic coatings on both interior and exterior.

19-9DL stainless steel, 0.043-in. thick, ceramic coating on interior only.

19-9DL stainless steel, 0.043-in. thick, uncoated control.

17-14 CuMo, 0.043-in. thick, uncoated.

310 stainless steel, modified, 0.043-in. thick, uncoated.

310 with columbium added, 0.043-in. thick, uncoated.

"Inconel X", 0.043-in. thick, uncoated.

N-155, 0.043-in. thick, uncoated.

"Hastelloy C", 0.043-in. thick, uncoated.

and 1623 hr. Headers were always installed on the same cylinder banks (row B) of the Pratt and Whitney engines.

The wear bands of each header were sawed off and test samples were taken from the header bodies. These were obtained from the hottest areas adjacent to the wear bands. New wear bands were welded on and the test headers were returned to service for further hours of actual flight test.

After 650 hr of service, the ceramic coated 19-9DL headers were compared with uncoated ones of the same material, in metallographic examinations. It was found that the ceramic coatings had prevented the occurence of oxidation, carbon absorption and corrosion attack and had successfully protected the surfaces of the headers. For the first time in Ryan experience, exhaust header sections with 650 hr service showed no signs of deterioration brought about by operating conditions.

No reduction in thickness was found in the header coated on both sides. Some reduction (0.003 in.) due to scaling on the exterior, was found in the header coated on the interior only. The uncoated header was reduced in thickness by 0.008 in. The ceramic coatings were applied in thicknesses between 0.001 and 0.002 in.

with carbide. The ceramic coatings have protected the surfaces. The interior of this header was very smooth. The green color of the ceramic coating had changed to black in appearance. A sample of this black coating, when subjected to spectrographic analysis, indicated that it contained the same ingredients as the original green coating. This shows that the ceramic material had not been removed but merely changed in appearance.

Fig. 3 shows a photomicrograph taken of the exterior of the 19-9DL header which was coated on the interior only. Scaling effect is shown.

Fig. 4 shows the surface of the 19-9DL test header, coated on interior only. The specimen was polished to determine the hardness of light etching zone at the surface. Hardness impressions shown represent an actual depth of about 0.0005 in. below surface, and gave a hardness reading of 20.5 Rc at the surface. An average interior hardness of 25.0 Rc was found. The header coated on both sides exhibited a hardness of 19.1 Rc at the surface with an average interior hardness of 23.5 Rc.

Observation and experience have shown that much deterioration of unprotected headers has been due to high rates of carbon absorption. with resultant surface embrittlement. In all

CHEMISTRY OF ALLOYS TESTED

	C	Mn	Si	P	S	Cr	Ni	V	Mo	Cu	Cb	Ti	W	Al	Co	N
310 (modified)	0.06	1.3	0.50	0.02	0.015	25.0	20.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
N-155	0.10	1.5	0.75	0.02	0.015	21.0	20.0	.....	3.0	.....	1.0	.....	2.5	.....	20.0	0.15
Inconel X	0.06	0.75	0.30	.....	0.01 max.	15.0	72.0	.....	.....	.....	1.0	3.0	.....	0.75	.....	.....
Hastelloy C	0.10	0.75	0.75	0.02	0.015	16.75	bal.	0.4	17.0	.....	.....	.....	4.5	.....	.....	.....
310 Cb.	0.06	1.3	0.50	0.02	0.015	25.0	20.0	.....	.....	.....	1.0	.....	.....	.....	.....	.....
17-14 CuMo	0.107	0.79	0.56	0.029	0.007	16.02	13.44	.....	2.55	3.00	0.47	0.28	.....	.....	.....	.....
19-9DL	0.30	1.0	0.50	0.02	0.010	20.0	9.5	.....	1.25	.....	0.35	0.20	.....	1.35	.....	.....

Fig. 1, taken at the hot zone, interior, of the header coated on both sides, shows a definite white area lying immediately under the surface of the ceramic material which has been decarburized. Fig. 2, showing an untested ceramic coated header, does not exhibit this characteristic. Therefore, it is the result of the conditions experienced in the test.

Fig. 1 also shows a sigma formation along

previous exhaust headers, examined after 650 hr there has been a definite increase in carbon content and a high rate of oxide absorption into the grain structure. The ceramic enameling prevents this carbon absorption, eliminates oxidation and inhibits corrosion attack, greatly extending the life of such parts.

The uncoated 19-9DL header showed a typical "salt and pepper" structure of carbide and

sigma after 1269 hr. This is characteristic of the structure after 400 hr of service. There is some oxide solution at the surface of the material and a moderate build-up on the surface. Aside from the tendency to absorb carbon, the time factor makes very little change in the general structure of this material.

Spectrographic analyses of the test headers coated with ceramics, after 1234 hr service, showed the coatings were still present and protecting the surfaces from oxidation. On the exterior surface of the header coated only on the interior with ceramic there is some oxide development, although excessive deterioration has not yet developed.

Little metal loss due to oxide

The test header fabricated from type 310 stainless with columbium added seemed to be in better condition than the other uncoated headers after 1368 hr of test. There is little evidence of metal loss due to oxide. A slight tendency towards decarburization can be seen in the photomicrographs of the interior surface, Fig. 5. There has been no grain boundary precipitation. However, there are large islands of sigma interspersed with small particles of carbide. The sigma formation is not continuous and will probably leave the material in a relatively ductile condition similar to 19-9DL. The sigma formation in 19-9DL does not attain as large a particle size as in type 310 columbium.

The modified type 310 stainless steel headers' hottest interior areas had a large grain structure with carbides along the grain boundaries after 1098 hr. Also, at the grain boundaries there was some spheroidal sigma. Within the grains, both spheroidal and needle sigma formed. Some oxide penetration had begun to develop at the juncture of the grain boundaries with the surface of the metal.

Heavy development of sigma

Later examinations of the modified type 310 test header, made after 1623 test hr, indicates a progressively deeper grain boundary penetration due to oxidation and corrosion. Fig. 6 exhibits this trend, along with a heavier development of sigma along the grain boundary as well as carbide precipitation. Some areas, not shown, indicate even more severe cases and greater depths of penetration along grain boundaries. The material would probably exhibit brittle characteristics in a bend test.

A photomicrograph of an "Inconel X" header after 1385 hr is shown in Fig. 7. It displays an intergranular penetration probably caused by corrosion resulting from the alteration of the grain boundaries, either by addition or loss of some constituents. The balance of the structure is in a severely overaged condition. The exterior of the header presents a smooth appearance with very little oxidation.

The structure of the "Hastelloy C" header after 1234 hr is shown in Fig. 8. This microstructure shows a condition of extreme overaging, together with heavy precipitate along the grain boundaries. This made the material extremely brittle. On a bend test, it fractured without taking a permanent set, demonstrating complete absence of ductility. This brittle condition made it necessary to remove this part from further service testing.

Upon parting the wear band from the header to obtain a metallographic specimen, the part cracked spontaneously, Fig. 9. This crack started from a defect which had existed under the wear band but was in a dormant state as evidenced by being completely filled with oxide.

A state of erosion had set in adjacent to the weld seam in the hottest operating part of the header, which is opposite to the port leg, Fig. 10.

The test header fabricated from 17-14 CuMo alloy was removed from service after 472 hr because of excessive thinning. Metallographic examination indicates that this thinning was due to intergranular corrosion at the surface of the material and high temperature oxidation.

The wear band had a thickness of 0.064 in. where least affected by oxidation and corrosion and measured from 0.032 in. down to the formation of a knife edge at the area most affected. The body of the stamping had a thickness of 0.036 in. at the coolest operating portion and a thickness of 0.030 in. where impingment of exhaust gases and high temperature appeared to be greatest. At the edge of the top of the weld seam, a measurement of 0.032 in. was obtained

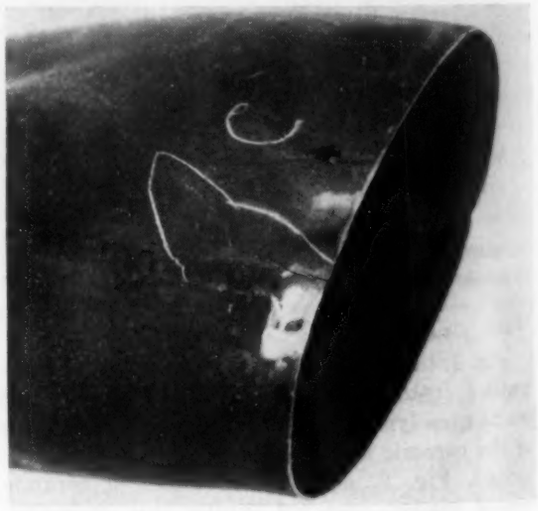

FIG. 9—Spontaneous crack occurred in Hastelloy C header when wear band was removed, indicating the brittle condition present after 1234 hr service.

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and 1/32 in. away from the weld, 0.027 in. was the thickness.

At the hottest operating area, at point of gas impingement, a condition of heavy carbide pre-

FIG. 10—The erosion which occurred inside Hastelloy C header opposite port leg, where high velocity gases impinge can be seen above and below weld.

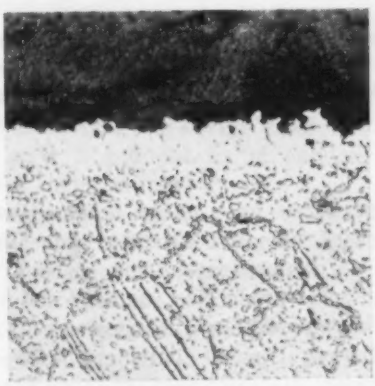

FIG. 11 — Uncoated, hot interior surface of N-155 developed heavy precipitation agglomeration within grain, along with decarburized layer. After 1098 hr. 400X.

cipitation developed, involving carbon absorption with oxide solution and intergranular attack along grain boundaries.

The test header fabricated of 17-14 CuMo cannot withstand the high temperatures at which this part operated. It is seldom that intergranular corrosion is observed in materials designed for conducting gases at elevated temperatures. Most materials, even though containing high percentages of unstabilized carbon, develop a tightly adherent film which excludes the product causing corrosion. In the case of 17-14 CuMo, the material developed a loose scale which did not prevent the attack by corrosive media.

A photomicrograph of the hot interior surface of the header made from alloy N-155 after 1098 hr is shown in Fig. 11. Heavy precipitation agglomeration within the grain can be seen. The surface of the material shows a white decarburized layer. This heavy precipitation tends to re-

FIG. 12—Ceramic-coated header after removal from refrigerator where it was cooled at —76°F for 18 hr.

duce the ductility. A 35° to 40° bend results in a brittle fracture. After 1623 hr, this specimen header showed pitting, a result of high velocity blow-by of exhaust gases.

A special test was conducted to ascertain the thermal shock resistance of the A-417 ceramic coating, as applied to the exhaust system headers. In this test a number of ceramic coated headers were cooled overnight to —76°F, held at that temperature for 18 hr and then heated with a special burner to 1700°F. Fig. 12).

Another group of specimens were cooled to 68.8°F for 4 hr and then heated to 1500°F. Still another group was cooled to —70.6°F held for 19 hr and then heated to 1600°F.

One specimen from each of the above test runs was dropped 6 ft onto a concrete floor when both cold and hot. Handling time was limited to 10 sec and sufficient time was allowed to produce complete heat saturation. After all test runs there were no cracks, chips or other damage to the ceramic coating. The ceramic coating stands up under severe shock by hot and cold temperatures. It does not appear to be susceptible to damage from mechanical means at extreme temperatures.

Additional tests are being conducted. It is becoming definitely established that ceramic coatings are decidedly beneficial in extending the life of the heat and corrosion-resistant alloys where oxidation and corrosion are major problems.

Since the ceramic coatings are extremely thin, from 0.001 to 0.002 in. weight increase is negligible. It amounts to 2 pct on 0.065 in. gage. In application, it is simpler to apply thin coatings and the control of thin coatings is more or less automatic. Heavier coatings tend to spall during the cooling from firing temperatures.

Parts coated with ceramics will stand an amazingly large amount of rough handling so that parts handling does not constitute a problem. For example, if realignment of parts is necessary after the application of ceramic coatings, the parts may be placed in jigs and rubber mallets used. Alignment jacks and alignment torch operations may be applied and the realigning performed without chipping, crazing or other damage to the coating.

PROBLEM CASTINGS can be turned into Production Jobs

by T. J. McLeer
Chief Foundry Engineer
Cooper Alloy Foundry Co.
Hillside, N. J.

Distortion, shrinkage and feeding difficulties characterize five problem castings produced by a stainless steel foundry. A jet engine support with spindly, multiple arms and a 2-ton, 4-blade propeller were among the jobs that had to meet close tolerances.

Small runs of castings that involve special methods of gating, core-making, pattern design and other factors are bad enough. But adapting such special methods to large-scale foundry production adds special complications. All five of the examples given are in this category and have been—or still are—successfully produced on a large scale. However, in most cases, the first attempts were not satisfactory.

A jet engine support casting, Fig. 1, now in regular production required 100 pct radiographic inspection. Zyglo testing was also specified, with the requirement that there be no distortion in the arms. Material used was type 316 stainless steel.

FIG. 1—At left, close-up of cope showing the feeding and gating arrangements for jet engine support. At right, close-up of drag showing location and fixing of cores. Distortion of the support was eliminated.

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Attempts had been made by another foundry to make the casting but without success, due to shrinkage, cracks, and distortion of the arms. The initial work showed that cracks and distortion were apparently dependent on the method of gating, collapsibility of cores and stresses set up in the casting during solidification. Shrinkage occurred in the heavy sections which, being isolated by thinner sections, were found to be impossible to feed.

New gating eliminates distortion

The distortion of the support's arms was eliminated by gating through a ram-up core, finger-gate assembly. This led into the central hub section of the casting. Previously, gating had been at the ends of the arms, which were distorted and/or cracked as the gating system contracted. Cracks at the junction of the arms with the main body of the casting were eliminated by putting cooling fins on the casting at that point. In addition, the mold surface in these areas was nailed.

Other cracks in the main body of the casting were virtually eliminated by using a core mix particularly adaptable because of its collapsibility. All cracks were not completely eliminated, but they were reduced in both number and size. This was done to the point where the customer has received satisfactory castings. A circular, segmented external steel chill was used at one hot-spot to prevent tearing.

Shrinkage in a heavy internal section was corrected by obtaining a change in design from the customer. This gave a reduced metal section which could be fed satisfactorily.

The mold was made in green sand (skin-dried). It was felt that with a casting of such shape a dry sand mold would hinder contraction and tend to crack and tear the casting. Prevention of coldshuts, which initially occurred because of the restricted flow in the finger gating, was achieved by pouring the metal as hot as possible.

FIG. 2—Preparing the molds for the casting of 8½-ft diam, 2-ton, stainless steel marine propeller

The pattern supplied for a four-blade, 8½-ft diam stainless steel marine propeller was found to consist of a single blade mounted on a 90° hub section, Fig. 2. And the standards involved hardly made the job any easier.

Blade widths had to be accurate within plus 3/16 in. or minus ⅛ in. or 2 pct of designed dimensions, whichever was the greater tolerance. The diameter was to be accurate within a minus tolerance of 0.5 pct.

Distance between centers of the blades was to be 90°, plus or minus 15 min. Each blade was to track from the shaft center within a plus or minus angle of 15 min at the tip. Alloy specified was type 410.

An eight-piece flask (four for drag sections and four for cope sections) was used to form and contain the complete mold. The flasks were first leveled up. A spindle foot was fastened to the bottom plates of the flasks. The spindle (perpendicular to the bottom plates) was inserted with a sweep board mounted on it. The bottom of the hub section was swept up and prepared for making the first blade. The single blade pattern was then placed on the spindle. Every effort was made to maintain the original precision.

Constant checking holds precision

A tripod template rested on the pattern blade and a level was placed on the template to indicate whether the blade was horizontal or not. The pattern was secured above and below by wedges, so that it could not be moved in any direction during ramming. The spindle foot was divided by 90° locations and had stops at these locations against which the blade was held. The ram-up was started.

While the drag section was being rammed, the level was constantly consulted to maintain the precision started with. First drag was rammed, joints were cut, and mold prepared to receive the cope. The cope was then rammed up with the head placed over the hub. After the cope section was rammed, it was lifted off, the blade pattern taken out, and then the pattern was rotated into the adjacent quadrant.

Other sections set up in same way

The next three sections of the mold were prepared in the same way as the first section. A gate was made (2½-in. diam down gate) which led into the bottom of the hub. A large runner box was rammed up on top of the cope over the down gate.

After the mold was dried, assembly of the copes and drags was started. As the copes and drags were put together, the seams were filled up and with the last cope the hub core was inserted. A large bell head was used to feed the casting. Pouring weight was 6500 lb and the casting proper weighed approximately 4000 lb, Fig. 3.

A much smaller but, in its own way, just as difficult a job involves a stainless steel shredder

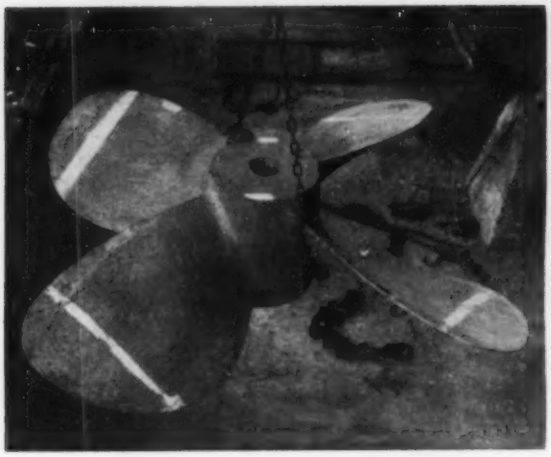

FIG. 3—As-cast marine propeller, made with a single-blade-and-hub-section pattern

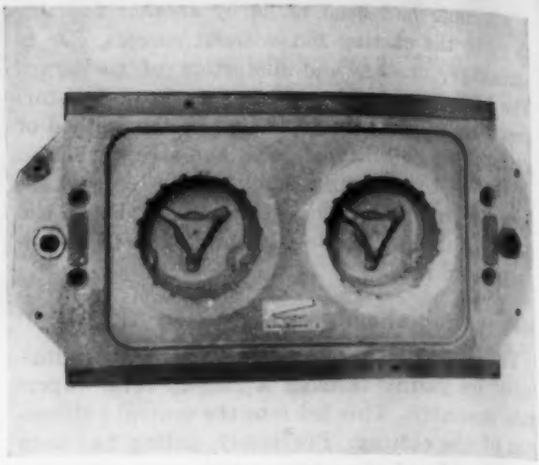

FIG. 4—Plastic patterns and matchplate were required for production of shredder rings for waste disposers.

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Problem castings (continued)

ring for a waste disposer. A modified 12 to 14 pct chromium-iron alloy was used.

Teeth were to be clean and free of defects. The circular and taper dimensions were to be consistently accurate. Hardness and hardenability were to fall within a definite range. Both ID and OD were to be concentric to guarantee machining of pads and cutting teeth.

At least two other foundries had failed to make these castings successfully. One of the two had submitted 17 different samples, all of which were rejected. The production of the casting was to be geared to very high production.

Very accurate pattern making was the key to maintaining the correct taper in high production, even though slight design changes were made frequently. Plastic patterns were used, Fig. 4. Cope and drag were mounted on separate boards so that a two-man team could work the job on a high output basis.

Over ½ million rings produced so far

The correct annealed and hardened properties were developed after considerable experimentation on heat treatment and chemical composition. Both factors require very close control to obtain consistent results. An annealed 26 Rc was maintained, rehardenable between 60 and 64 Rc.

Concentricity of ID and OD was found to be dependent upon the method of gating and heading. Satisfactory results were obtained by gating into the top of the casting at three points spaced 120° apart and by pouring down into the gates through a centrally located sprue. The vertical sprue above the casting was used as a riser for the necessary feeding of the casting.

Over ½ million of these shredder rings, Fig. 5, have been produced up to the present time.

A very intricate, cast stainless rocket valve body is now being made in the foundry, Fig. 6. This job was to be quality controlled with 100 pct radiographic inspection. No weld repairs were allowed.

The primary problem related to the coring of the casting, as very thin core sections and accurate core assemblies were required. The isolated heavy sections presented a feeding problem and the thin sections were difficult to run.

The castings were produced by using various jigs and gages in the assembling of the cores. Cast-to-shape chills were necessary to obtain soundness and get to sections which could not be fed properly. Certain sections were modified slightly with customer approval in order to give complete soundness. The casting weighed 11 lb and was cast in type 347 alloy.

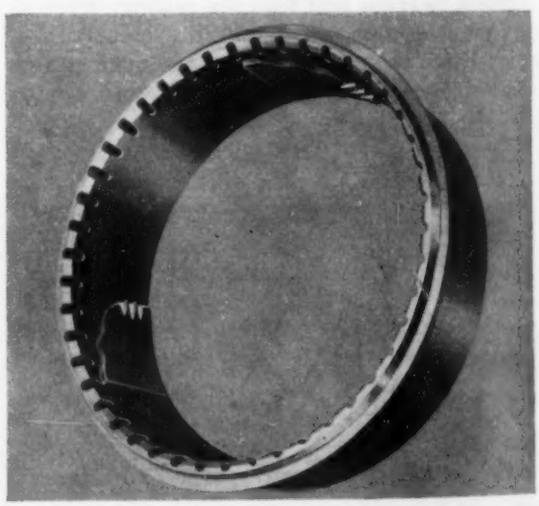

FIG. 5—Finished stainless steel shredder.

A stainless steel casting made for a mixing operation in plastics production was shaped more or less like the letter "Z," Fig. 7. Known as a "sigma blade," a cored hole throughout its 12 ft

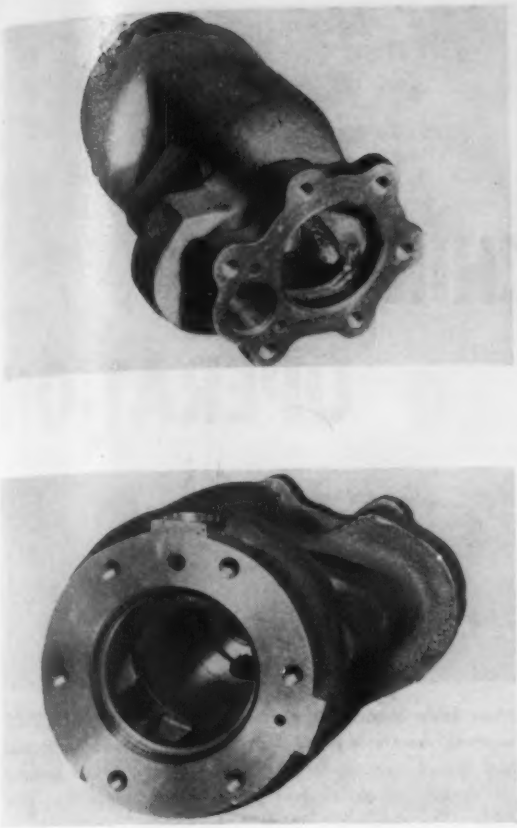

FIG. 6—These two views of two ends of a type 347 stainless steel rocket valve body can give only a partial idea of the intricate interior contours involved.

FIG. 7—A cored hole was cast in this sigma blade. It had to be located centrally throughout the casting.

of lineal length was required. The hole had to be located centrally within all the various cross sections.

The configuration alone of this casting provided considerable difficulty in molding. The most difficult problem was to determine how a 1½-in. hole could be incorporated. It was seen at once that due to the length of the cored hole, its shape and small diameter would make it impossible to use a conventional sand core.

It was decided to use a pipe of the same alloy (type 304) as the casting, bent to the proper shape and having an inside diameter equal to that of the desired hole diameter. This pipe would be placed in the mold and water would be forced through it during the pouring and solidification of the casting.

In order to shape the pipe so that it would be located centrally in the casting it was necessary to make a special jig in which the pipe could be accurately formed. The pipe was hydrostatically tested for leaks before being placed in the mold.

One hose was connected to one end of the shaped pipe and an exit hose to the other end. Water was run through the pipe for a few minutes before pouring until a bubble-free stream was obtained. The gating was located so that the incoming metal did not impinge directly on the pipe. Water was run through the pipe for about a half-hour after the casting was poured to prevent any melting of the pipe. The pressure from the main water line was from 60 to 75 psi.

planning PAYS OFF in TRANSFER MACHINE OPERATION

By W. G. Patton
Detroit Editor

Sound planning has paid off in high production and trouble-free operation on Warner Gear's big 118-tool transfer machine. Proper casting preparation and good machine design eliminate most causes of machine trouble and reduce downtime.

Precautions taken at the time the 28-station Cross Transfer-matic machine was designed for Warner Gear Div., Borg-Warner Corp., are paying off in terms of high production and trouble-free operation.

Included in the measures taken to insure a continuous supply of quality parts for the transfer machine are: Use of metal foundry patterns; application of a rust preventive and subsequent cleaning of castings which may have to be stored for extended periods; and Kolene cleaning of all castings. (THE IRON AGE, March 15, 1951, p. 105.) Design features include a well-engineered chip disposal system; an accurate transfer mechanism; sound tool design; and installation of Cross Toolometers to control changing of 118 tools on the machine.

Operations on the case of the Ford automatic transmission include drilling, tapping, counter boring, reaming and spot facing. Hardness of the gray iron castings ranges 190 to 228 Bhn.

During the past several months average daily production has held consistently at the original estimated capacity figure. Warner Gear Div. supplies one-half the automatic transmission units for Ford and Mercury.

Operating experience at Muncie has demonstrated that the transfer machine is an efficient high production tool. However, to get these results, it is necessary to make a careful study of the causes of interruptions.

The principal causes for interruptions are: Deficient castings; broken tools; and regularly scheduled tool changes. Only a very small number of interruptions are caused by electrical and mechanical difficulties.

Obviously, the larger the machine and the more tools operating, the greater the possibility of interruption. By careful planning these obstacles have been offset and high efficiency obtained.

It is significant that, except for the substitution of some carbide-tipped drills for high speed drilling, tooling of the transfer machine is virtually unchanged since it went into service. Most of the tools used are of standard design. Carbide-tipped drills and spot facing tools are used.

The use of metal foundry patterns has undoubtedly contributed to the outstanding service record of the Borg-Warner transfer machine. Using metal patterns and carefully controlled foundry practice, size variation in the castings

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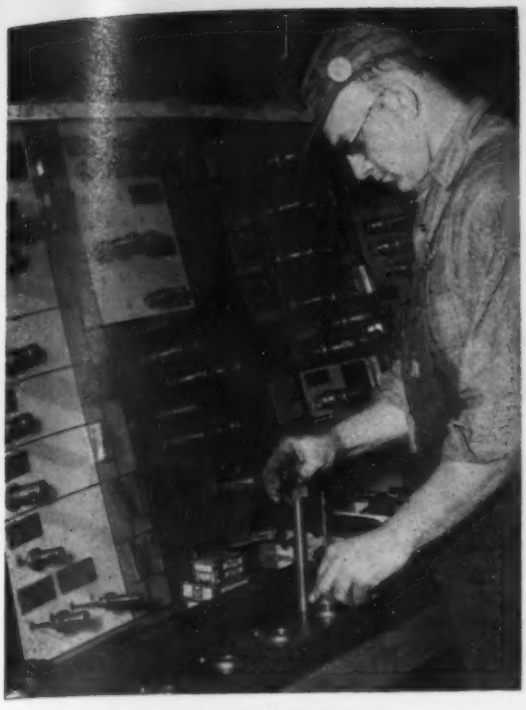

TOOL CHANGING is simplified by this board which counts number of operations each tool has performed, shuts off machine when a tool is ready for changing. Board holds extra cartridges with sharpened tools ready for change.

as received at Warner Gear have been limited from ⅛ to 5/16 in.

The base of the castings is straddle-milled prior to entering the transfer machine, thereby reducing the tolerance for the base dimension at this point to ±0.010 in. Operating experience indicates overall height of the castings may vary ¼ in. The machine compensates for this.

Cleanliness is important in production of automatic transmissions. Every precaution has been taken to remove dirt from the production cycle.

For example, the valve mechanism is assembled on Plexiglas. Workmen are required to wash their hands frequently but are not permitted to dry them on a towel since this might introduce dirt or lint into the fluid passages. Cleanliness of castings is important for operation and tool life.

At Warner Gear all finished castings that must be stored are treated with a rust-proofing oil. Before the castings go into assembly they are degreased and cleaned at 180°F. Surface carbon and burned-on sand is removed in a Kolene bath at 700°F in the rough stage.

Careful thought has been given to the removal of chips from the machine. There is ample chip clearance around the operating points and between the locating rails and the parts. This results in the clamp falling freely. Chips fall straight down to two screw-type chip conveyers located in the base of the machine. The conveyers carry the chips from both ends of the machine to the center. Chips are emptied into a wagon.

Chips accumulating along the transfer rails are forced through serrations or openings in the rails. Early operating experience indicated some minor changes in the chip openings of these rails would be desirable. In some locations, notches were turned in the opposite direction.

Most of the interruptions in operation of the Cross machine have occurred between Stations 14 and 28. At Station No. 14, the castings moving down the transfer line are turned 90°. After being turned, the base of the casting is only partially parallel and irregularly curved. It is less accurate in dimension than the milled edges. This situation presented a minor problem in transferring. Some of the earlier castings tended to turn slightly, preventing proper transfer. By eliminating the chip slots on the sides of the transfer rails and installing a rubber shoe to insure that one side of the part would keep contact with the guide rail, the problem was solved.

A change in the overall height of the parts was made in order to provide a more rigid housing. This change made it necessary to provide greater height between the locating rails and the clamping mechanism. This was easily accomplished by raising the entire line of clamping bridles approximately 3/16 in. A weight-actuated cam clamp facilitates changeover.

Basic components of the Cross machine control unit are a master control board, master tool setting fixture, a work bench, and Toolometers which automatically shut down the machine when tools need changing. Gages are provided for the pre-setting of tools. After pre-setting, tools are inserted in the proper position on the board and are ready for installation. No adjustment is needed in the machine for length of holes.

The board is divided into sections for each type of tool in the machine. Each section has both a setting gage and storage space for two complete sets of tools and holders. Color is used to identify the position of the head. The Toolometer provides a visual record of the used and unused life of every one of the 118 tools in the machine.

TRANSMISSION CASES are machined on the 28 stations of this Cross Transfer-matic at Warner Gear Div.

ARC-CAST and POWDERED MOLYBDENUM TESTED

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Unalloyed, molybdenum has good ductility but becomes brittle at temperatures not much below freezing. Tensile and creep strengths at high temperature are low. While further research should lead to useful alloys, molybdenum-base gas turbine blades are unlikely.

by J. H. Bechtold
and
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Due to its high melting point, availability and good high temperature creep properties, molybdenum is one of the most promising base metals for the development of heat resistant alloys capable of supporting useful loads at temperatures above 1600°F.[1] As a preliminary to such development, it was considered necessary to determine at least the major factors which influence the ductility of pure molybdenum.

While molybdenum cannot be melted and cast by conventional means, it can be consolidated into ingots suitable for working by either powder metallurgy techniques or by the more recent arc-casting process.[2].

The powder-metallurgy molybdenum used for this investigation was supplied by the Lamp Div., Westinghouse Electric Corp. and the arc-cast molybdenum by the Climax Molybdenum Co. (see accompanying table). Differences in the initial condition of these materials were striking. The arc-cast ingots had a coarse columnar grain structure while that of the powder-metallurgy product was very fine and equiaxed. The latter material can be worked by forging or rolling at relatively low temperatures, which are below the recrystallization point.

However, an initial high-temperature hot-forging or rolling operation is required to break down the coarse columnar grain structure of the arc-cast ingots. Once this coarse grain structure is eliminated, the arc-cast material can be rolled or forged into sheet or bars by the same procedure as the powder-metallurgy molybdenum. The small-grained structure of the powdered metal ingots also facilitates attainment of this type of structure after working and annealing. This is very desirable, since the only method of control, which in turn largely controls the mechanical properties, is by work-hardening and annealing.

From a paper presented at the Washington, D. C., meeting of the American Electrochemical Society held earlier this year.

Both materials were obtained as 2⅛ in. diam bars, the powder-metallurgy ingots being received as-sintered, with no previous hot or cold working. The arc-cast samples had been forged from a larger as-cast ingot, probably 4 to 6 in. diam. This forging operation produced a grain structure in the arc-cast molybdenum similar to, but considerably coarser than, that of the as-sin-

CHEMISTRY AND MECHANICAL PROPERTIES OF TEST SPECIMENS

Specimen number	Method of consolidation	Carbon, pct	Oxygen, pct	Nitrogen, pct	Others	Tensile Properties*		Hardness DPH (50 kg load)	Density, g per cc
						Breaking Load, psi	Elongation, pct		
CSN-10S	Arc-Cast	0.031	0.0002	0.0056	Spectrographic traces of Fe, Si, Cu, Mg	Not available as cast			
CSN-40S	Arc-Cast	0.031	0.0005	.....	Spectrographic traces of Fe, Si, Cu, Mg	Parallel to ingot axis (1) 45,400 0.4 (2) Broke as load was applied (3) 49,000 1.5 Perpendicular to ingot axis 42,800 0.5		165	10.04
WNS-20S	Sintered	0.004	0.006	0.0041	Spectrographic traces of Fe, Si, Cu, Mg	Perpendicular to ingot axis (1) 84,700 0.0 (2) 76,500 0.0		161	9.8–10.0

* Test specimen: 0.225 in. diam over 0.550 in. gauge length, shoulder loaded.

tered ingot. It was possible to roll both materials from 2⅛ to ⅝ in. diam by the same procedures and to obtain almost identical grain structures after a final recrystallization anneal.

Rolling was done with frequent reheats at temperatures between 1885° and 1705°F. The time of reheating was regulated to avoid recrystallization, so the bars were effectively work-hardened with a reduction in area of 91 pct. Except for a few molybdenum carbide particles in the arc-cast molybdenum, no non-metallic inclusions or micro-porosity were observed in either material after rolling.

Tensile and creep-rupture specimens were machined from the ⅝ in. diam bars in the as-rolled condition and then annealed for ½ hr at 2100°F in dry hydrogen. This annealing treatment produced the completely recrystallized and equiaxed grain structures shown in Figs. 1 and 2.

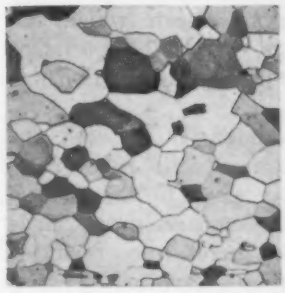

FIG. 1—Worked and recrystallized arc-cast molybdenum, showing microstructure of specimen material. Average grain size, ASTM No. 7.3 (1200 grains per sq mm). 100X.

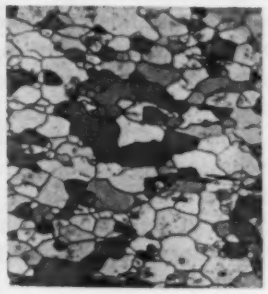

FIG. 2—Worked and recrystallized powdered molybdenum, showing microstructure of specimen material. Average grain size, ASTM No. 7.8 (1650 grains per sq mm). 100X.

Tested at various temperatures

The tensile specimens were pulled to fracture at a series of temperatures above and below atmospheric and at a slow, approximately constant strain rate of 2.8×10^{-4} sec^{-1} (100 pct per hr). This strain rate is the same magnitude but slightly slower than that ordinarily used for the static tensile test. The tensile testing machine used embodies features described by Nadai and Manjoine in 1941[3]. Notched specimens were tested in the same manner as the standard tensile specimens.

The tests showed, as anticipated[4], an abrupt change in tensile properties at slightly below atmospheric temperatures. Characteristic points on the stress-strain curves are noted and these values together with reduction in area are plotted against test temperature in Figs. 3 and 4 to show broadly how properties change with temperature. Reduction in area values at 212°F and higher are approximate. They are probably low because of longitudinal splitting in the neck prior to transverse fracture, which made it impossible to measure area accurately after fracture has occurred.

True stress at fracture for the specimens tested at 212°F and above also is somewhat uncertain. However, these conditions did not exist in or below the temperature range of transition from ductile and brittle fracture.

Both materials had pronounced upper and lower yield points, a characteristic in metals with body-centered cubic crystal structure after certain heat treatments. This yield point phenomena in molybdenum is believed to be related to the nitrogen content.[5] Annealed mild steel also has an upper and a lower yield point which also has been correlated with nitrogen or carbon or both.[6]

If transition temperature is defined as that between the maximum and minimum, transition points of 41° and —13°F are obtained for the arc-cast and powder-metallurgy molybdenum, respectively. Above this transition zone both the arc-cast and powder-metallurgy molybdenum have excellent ductility, but below they are completely brittle. The slightly lower transition temperature of the powder-metallurgy molybdenum

does not indicate any significant superiority. It was probably due to the smaller grain size and normal variation from sample to sample.

Double fractures in the arc-cast specimens tested at —101° and —33°F were probably due to elastic shock waves. The powder metallurgy specimens tested below the transition temperature also had double fractures.

Fractures prove to be similar

Microscopic examination of fractured surfaces revealed that types of fractures in the arc-cast and powder metallurgy molybdenum specimens were similar. Below the transition temperature transgranular-cleavage fracture was observed. The fractured surface was bright, typical of most brittle metals that fail by cleavage, and approximately normal to direction of loading. Microscopic examination of the fractured surface showed well-defined cleavage facets which had numerous strain markings, even in the specimens for which no measurable plastic deformation was observed.

There is a striking similarity between the behavior of molybdenum at slightly below room temperature and iron at close to the boiling point of liquid nitrogen. Comparison was made with curves for annealed ingot iron, replotted from tensile data of Geil and Carwile.[7].

The reasons for an abrupt transition from ductile to brittle behavior in the body-centered-cubic metals has not been determined. However, many of the factors have been identified. Unpublished tensile data on molybdenum were obtained by one of the authors along with results of numerous tests on steel[8, 9, 10]. Increased strain rate, stress conditions that restrain the flow of the metal or an increase in the grain size will raise the transition temperature. Strain hardening induced by folling, forging or drawing in the direction of metal flow lowers the transition temperature—or at least retains some ductility below that point. However, the ductility normal to direction of flow is reduced. Non-metallic impurities, such as carbon, oxygen and nitrogen, that form interstitial solid solutions, probably raise the transition temperature.

Notch heightens transition point

The specimen, used to determine the effect of notching had a sharp V-notch with a calculated elastic stress concentration factor at the root of 3.1. The reduction in area, proportional limit and true stress at fracture are plotted as a function of testing temperature in Figs. 5 and 6. Comparing these figures with Figs. 3 and 4, it can be seen that the transition from ductile to brittle behavior was 248° to 203°F higher than for the standard tensile specimen.

The true stresses at fracture are the average stress over the reduced area under the notch. Due to the stress concentrations, a stress several times this average value can occur at the root of the notch. Above and in the transition range sufficient plastic deformation occurs at the root of the notch to relieve these stress concentrations. Below the transition temperature molybdenum behaves in an almost elastic manner and the stress concentrations are not relieved. This results in a crack across the reduced section of the specimen at a very low average stress.

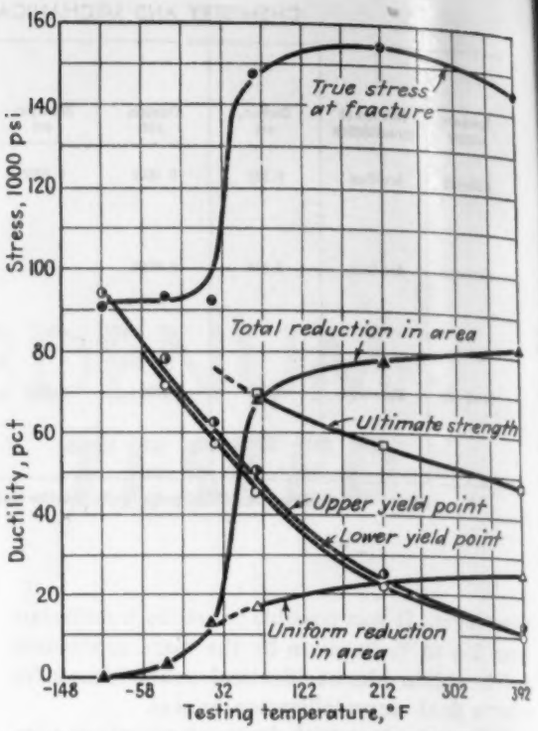

FIG. 3—Tensile properties of arc-cast molybdenum.

Multiplying this average true stress by the axial stress concentration factor, 3.1, the actual stress is approximately the same as for the standard tensile specimens tested below the transition temperature. Sharp changes in contour must be avoided in parts made of molybdenum that must support loads, especially dynamic loads, at close to atmospheric temperatures.

The notched specimens failed with the same types of fractures as those observed in the standard tensile specimens.

Neither the standard or the notched specimens were tested at the fast strain rates encountered in conventional impact tests. A part fabricated from molybdenum may behave in an entirely different manner if stress system, strain rate and size depart materially from those of the tensile test.

Creep tests have previously been made on molybdenum.[1] The material involved was somewhat coarser grained and perhaps not as reproducible. On that account, it was felt that tests at a single temperature, 1600°F, would suffice for a comparison between the two lots used in the present work and between them and previously reported material. The creep testing machine

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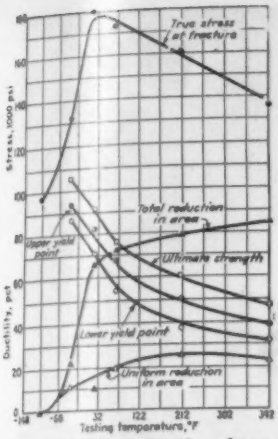

FIG. 4—Tensile properties of powdered molybdenum.

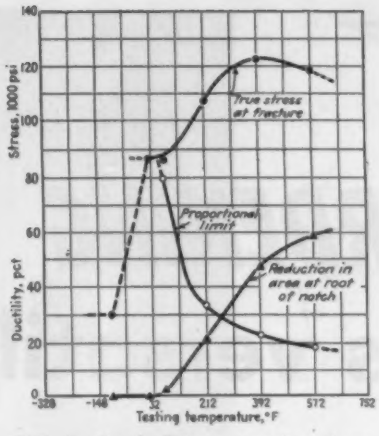

FIG. 5—Notched bar properties of arc-cast molybdenum.

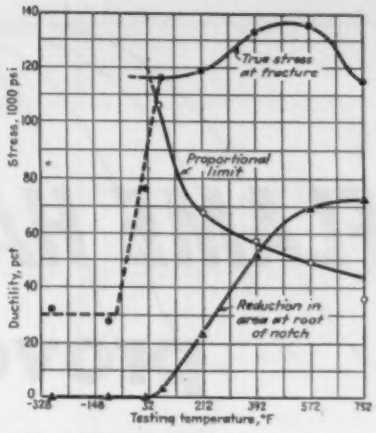

FIG. 6—Notched bar properties of powdered molybdenum.

described by Manjoine[11] was used with an atmosphere of hydrogen to avoid oxidation during test. Specimens were machined from the same bar used for tensile test material and were recrystallized to the same grain size.

The rupture life, the transition point and the minimum creep rate are plotted as a function of stress in Fig. 7. These curves show that arc-cast and powder-metallurgy molybdenum have very similar creep-rupture properties. The arc-cast molybdenum had a slightly longer rupture life and slower creep rate at 20,000 psi but not at 15,000 psi. It is doubtful that there is any significant difference between them. A test on the arc-cast molybdenum at 11,000 psi is not yet complete. The plastic strain at rupture, or when the test was completed if stopped before rupture, is also recorded in Fig. 7. It indicates the high ductility of molybdenum at 1600°F.

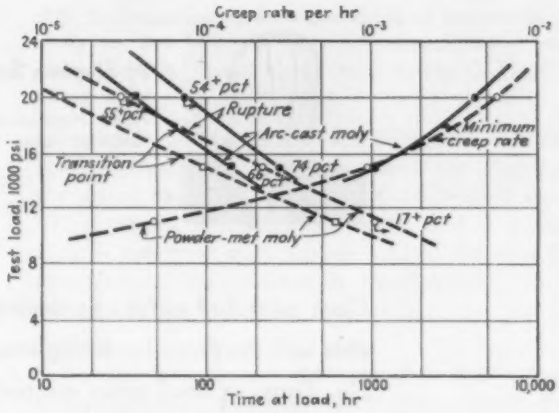

FIG. 7—Creep-rupture data on both types of molybdenum. Tests made at 1600°F temperature in hydrogen atmosphere.

Rupture strengths compared

Compared on the basis of equivalent 100-hr rupture strengths, molybdenum is about the same as iron at a temperature 932°F lower or cobalt at a temperature 572°F lower. The creep-rupture strength of pure nickel has not been reported, but it would probably be between that of iron and cobalt. The rupture strength of iron, cobalt or nickel can be increased greatly by proper alloying, as illustrated by "Refractaloy 70" and "Stellite 31."

Even then, above approximately 1652°F their rupture strength is no better than that of pure molybdenum. A similar improvement in the creep properties of molybdenum should be possible by proper alloying. In fact, a 100-hr rupture strength of over 30,000 psi at 1600°F has been obtained in pure molybdenum simply by work-hardening. However, such improvement in pure molybdenum is not feasible above 1652° to 1742°F. At these temperatures and above, work-hardened molybdenum will recrystallize during prolonged heating.

Although pure molybdenum was found to have as good or better rupture strength above 1652°F than refractaloy 70 or stellite 31, it does not mean that it would be as good a material for normal high-temperature applications. This is especially true where oxidation resistance or dimensional stability is required, since at these temperatures pure molybdenum oxidizes very rapidly in air or other oxidizing atmospheres. Even in a reducing atmosphere, molybdenum creeps very rapidly and a relatively large amount during the initial creep stage.

Acknowledgments

The writers wish to acknowledge the assistance of J. W. Marden, M. J. Manjoine, E. T. Wessel, and R. L. Anderson.

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FLAME HARDENING proves versatile heat treating method

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Close control of surface hardening and depth of hardness are possible with the flame hardening setup at National Forge & Ordnance Co. Large or small areas are surface hardened with equal facility and less expense than with other comparable means.

A variety of large and small parts are being successfully flame hardened at National Forge & Ordnance Co. with equal ease and less cost than with other comparable heat treating methods. While each job requires a definite setup and equipment, each setup will do many sizes of work. Flame hardening of shafts and rolls can be done with one set of equipment. Special shapes such as gears or machine ways require a different setup and machinery.

Flame hardening at National Forge includes surface hardening of shafts, pump piston rods, push bars, forging hammer rods, crankshafts, and paper, rubber and steel mill rolls. Roll sizes range from 4 to 18 in. diam and to 20 ft in length. Most rolls have smooth surfaces, but engraved or corrugated rolls are flame hardened with equal ease.

Successful flame hardening is a controlled metallurgical process. It must start with the steel used and be carried through successive heat treatment with full knowledge of the condition of the steel at each stage.

Steel is produced by melting the highest quality materials in a basic electric furnace. The ingot is clean and has the exact chemical analysis to meet the requirements for high quality forgings. Forgings are processed to give the best structure for rough machining operations. After machining, they are heat treated to obtain desired properties and the best condition for the flame hardening operation.

Round surfaces are flame hardened in a specially designed machine similar to a large lathe (Fig. 1). It consists of a bed, a fixed headstock and moveable tailstock which can be positioned to receive the work between centers. The flame

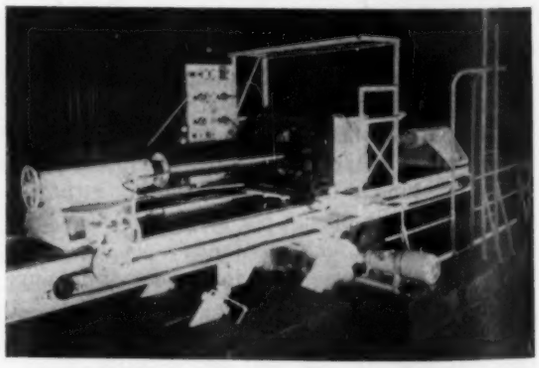

FIG. 1.—Rolls and other rounds are loaded into machine equipped with headstock, carriage and tailstock.

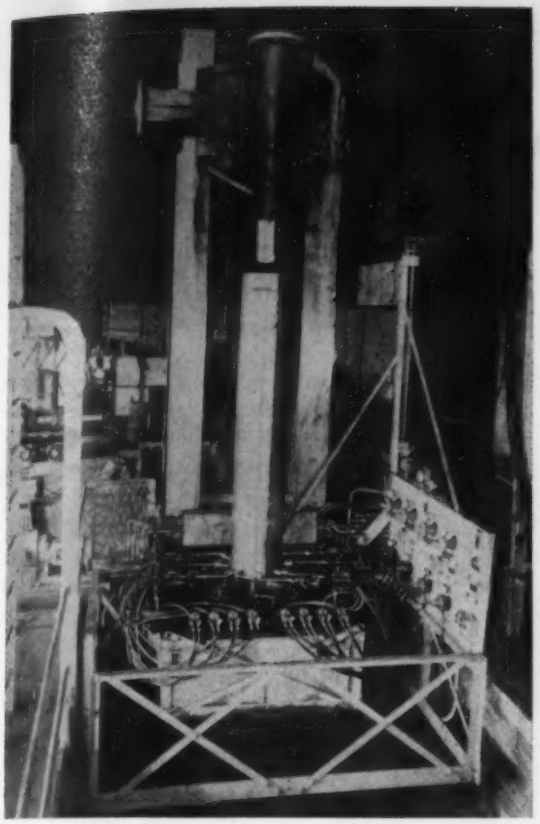

FIG. 2.—Hydraulic cylinders raise machine to vertical operating position. Operator's platform is next to control panel, travels upward with flame mechanism.

hardening apparatus is mounted on a moveable carriage. The operator rides on the carriage platform during the operation. A panel board mounted on the same carriage contains all controls, such as oxyacetylene regulators, pressure gages, gas valves, electric controls for the movement of the carriage upward and downward, and for rotation of the workpiece. The machine pivots about a central point and is lowered into a horizontal loading position. Work is loaded by crane and secured between centers. Two hydraulic cylinders raise the machine into the vertical operating position as in Fig. 2.

Standard oxyacetylene flame hardening torches and apparatus are used. For special applications, special burners and quenching equipment are designed and made in the plant. The quench medium is a 10 to 1 solution of water and soluble cutting oil. The usual speed of rotation is 1000 sipm. Acetylene is consumed at a rate of 150 cu ft per hr per in. of diam.

Acetylene is supplied from a central generating plant and piped to the main plant. Oxygen is piped from a bulk oxygen trailer installation. At the flame hardening machine the gas pipe lines end and the acetylene and oxygen are carried through heavy flexible rubber hose to the control panel. Here the pressure of each gas is adjusted for the operation on hand.

Surface temperature and depth of hardening are controlled by coordination of gas flow, speed

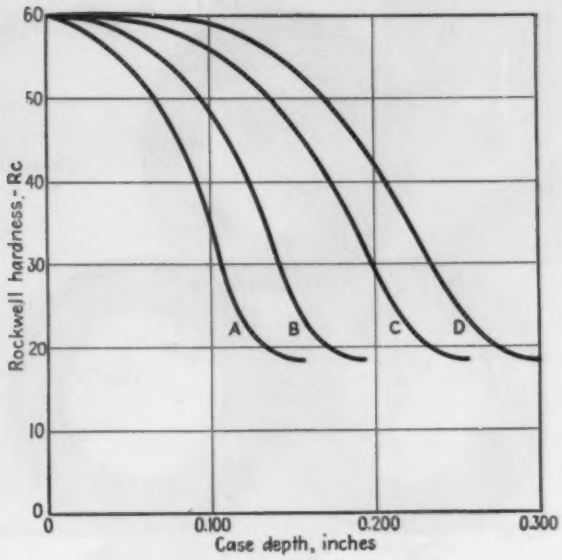

FIG. 3.—Degree of hardness and depth of penetration are shown for SAE 1050 steel with four rates of flame travel along work axis. Speed in sipm: A, 5; B, 4½; C, 3½, D, 3.

of burner travel and rotation of work. Variable speed reduction motors are used for changing the speed of burner travel and rotation of work. The burners surround the work and a quench ring is mounted at a predetermined distance below them. The surface is progressively flame hardened upward from end to end in one operation.

Shields protect the operator from the intense heat during a prolonged operation. Every precaution is used to provide a safe gas system and safe operating conditions.

All SAE steels have been investigated for flame hardening adaptability. Where surface hardness is the primary consideration, alloy steels have no advantage over plain carbon steels. The surface hardness obtained on flame hardened plain carbon steels covers the full range of hardness required from alloy steels. Generally the hardness specified falls into the ranges, 60-70, 70-80, 80-90, and 85-95 scleroscope. An SAE analysis is selected for each hardness range and then modified to meet specific requirements. Within limits, the base structure can be heat treated

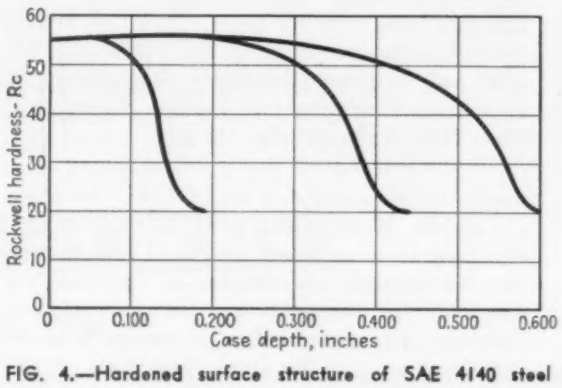

FIG. 4.—Hardened surface structure of SAE 4140 steel merges into base structure with gradual transition zone.

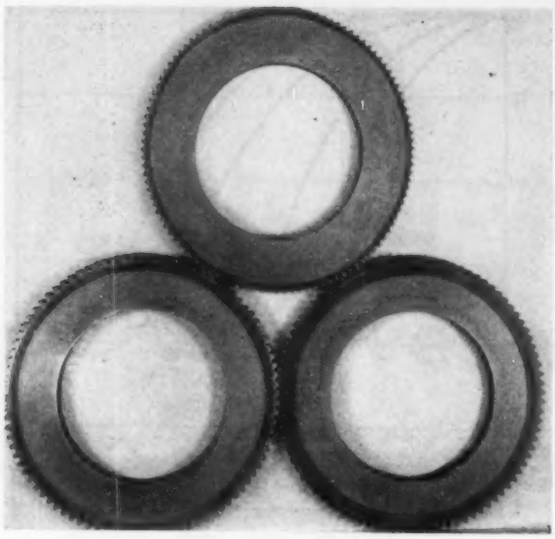

FIG. 5.—Etched roll sections cut from hardened 10 in. diam corrugating roll show uniform depth of hardening.

SPEED AND HARDNESS DEPTH RELATION

Flame Tip Travel in. per min.	Depth in in.*
2	5/16
3	1/4
4	3/16
5	1/8
6	1/14
7	1/32

* Depths vary with metal analysis, distance of flame from work, severity and position of the quench and thickness and shape of the part.

Flame hardening (continued)

prior to flame hardening for definite strength requirements. Generally a normalizing treatment will fulfill this requirement.

The degree of hardness and depth of penetration obtained on an SAE 1050 plain carbon steel for four different rates of flame travel are shown in Fig. 3. Fig. 4 shows hardness curves for an SAE 4140 chrome-moly steel. The flame hardened surface structure merges into the base structure with a gradual transition zone.

The great depth of hardness that can be obtained in flame hardening SAE 4140 steel is indicated by the curves in Fig. 4 and by the etched roll sections shown in Fig. 5. These sections are cut from a 10 in. diam corrugating roll.

Greater depth of hardening can be more easily obtained with alloy steels; however, the depth of hardness that can be obtained on plain carbon steels will meet most requirements.

Extreme uniformity in hardness and depth of hardness is obtained. Uniform heating and quenching leave no soft spots.

NEW BOOKS

"*Machining of Stainless Steels,*" combines in brief form the pertinent data on machining of an important class of steels. Composition and general characteristics of wrought stainless steels, practical considerations in machining, tool design, and lubricants are discussed. Metal Cutting Tool Institute, 405 Lexington Ave., New York 17, N. Y. $1.00. 27 p.

"*Frontiers of Personnel Administration.*" The 1951 Conference on Industrial Personnel brought together many industrial thinkers on personnel problems. New developments in personnel administration, and new ideas and methods of using established personnel management tools were discussed. This book brings comprehensive coverage of the conference, its aims and its accomplishments. Department of Industrial Engineerng, Columbia University, New York, N. Y. $12.50. 151 p.

"*Practical Electricity and Magnetism,*" by Maurice Rubin. Written with simplicity and clarity, this book is an excellent source of information for the layman who wishes to increase his knowledge of electricity and its application to industry and science today. Chemical Publishing Co., Inc., 212 5th Ave., New York, N. Y. $7.50. 356 p.

"*Electroplating.*" A clear explanation of the mechanics of electroplating of many commonly used industrial metals is presented in this new book. Written for the trained metallurgist, engineer or chemist, who wants to know more about electroplating, the book goes into considerable detail on fundamentals. Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. $5.00. 257 p.

"*An Evaluation of the Hardening Power of Quenching Media for Steel,*" by E. J. Eckel, R. M. Mayfield, G. W. Wensch, F. A. Rough. Of interest to heat treaters and metal users is this study of more than 30 quenching media. University of Illinois, Urbana, Ill. $1.50. 131 p.

"*Industrial Furnaces.*" The fourth edition of Vol. 1 brings up to date one of the best known and most thorough expositions of industrial furnace technology. Recent research on heat transfer and furnace design have indicated the value of new applications. Chapters include discussions on heating capacity, fuel economy, heat-saving appliances, strength and durability, and movement of gases in furnaces. About 40 pct of the text has been rewritten. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $10.00. 526 p.

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5500 military planes this year...

means millions of welds—
over 90% of them are being produced with
Sciaky Spot and Seam Welders

WHAT'S so important about this fact? Simply this — the overwhelming preference for Sciaky machines in this most critical of all welding is proof of the superiority of Sciaky Three-Phase resistance welding.

Developed and pioneered by Sciaky, the Three-Phase Principle is now the accepted method of resistance welding as was the Sciaky Storage-of-Energy Principle during World War II. Because of its versatility the Three-Phase Principle has now made Sciaky resistance welding a practical answer to joining requirements for many ferrous and non-ferrous metals in a wide variety of industries. It can work for you . . . and Sciaky engineers will show you how. Write for bulletins describing the Three-Phase Machines.

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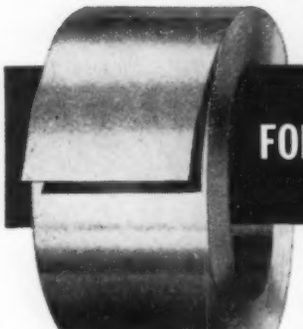

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is custom-made steel suitable for innumerable products. It offers many time-saving advantages, too. It's a productioneer's tool—providing a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved.

Follansbee Cold Rolled Strip in coils is available in tempers and finishes to meet most specifications. Take advantage of Follansbee's custom-service. It's tailored to *your* metal-working requirements. Call the Follansbee Steel Representative near by and he'll tell you all about it.

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—Free Literature—

Continued

Press brakes

Complete information and specifications on the 1500 and 2000 series all-steel, power press brakes and steel forming dies are featured in a new 10-p. catalog. The Airtherm Metalworkers are for heavy sheet metal and light plate work and offer such features as wider bed and greater die space, stroke and throat depth. *Airtherm Mfg. Co.*

For free copy insert No. 14 on postcard, p. 165.

Wire rope

Wire rope slings furnished complete with fittings ready for the job are providing extra safety and cutting sling costs. Interlacing construction of Tuffy slings, described in a new folder, gives extra flexibility and longer life. Slings are proof-tested to twice their working load limit and tag labeled. *Union Wire Rope Corp.*

For free copy insert No. 15 on postcard, p. 165.

Heat exchangers

A new and expanded edition of "*Anaconda Tubes and Plates for Condensers and Heat Exchangers*" has been published. This 44-p. booklet discusses the application and installation of condenser and heat exchanger tubes, plates for tube sheets, heads and baffles. Two new subjects cover "Operational Factors Affecting Tube Life" and "Corrosion Factors in Condenser Tube Service." *American Brass Co.*

For free copy insert No. 16 on postcard, p. 165.

Electronic generator

High frequency alternating currents tend to concentrate at the surface of a conductor. By taking advantage of this "skin effect" electrical power may be converted to uniform and highly localized heat. Higher frequencies provide a wide range of heat for machining operations. RCA electronic power generators provide these high frequency currents. How they work and what they do is described in a new bulletin. *Radio Corp. of America.*

For free copy insert No. 17 on postcard, p. 165.

For Defense or Essential Civilian Use—

get the mo$t for your Zinc Die Ca$ting Dollar!

OBTAIN COMPLEXITY OF SHAPE AT LOW COST

Whether that new product is destined for essential home front consumption or for military use, investigate the cost-saving features of ZINC Die Castings for the critical metal components. The fuze body and the delay housing of the well-known hand grenade are excellent cases in point.

All during World War II the ZINC Die Castings pictured at the right below met the demands of unfailing performance in the "pineapples," and now they again are specified for the same critical components of the grenades in current production.

Although complex in shape, these castings are produced at high speed in multiple-cavity dies, with only one machining operation required on each piece prior to assembly—an internal thread is machined in the fuze body and a hole is broached in the delay housing. Not only are all holes and recesses cored, but the external threads on the delay housing also are obtained in the casting operation. By any other means of production more parts would be required, or secondary operations would be excessive.

GET DESIGN INFORMATION

Any die casting company will be glad to help you in adapting the design of a part to its most economical production by the die casting process. Also ask us—or your die caster—for a copy of "Designing for Die Casting" and other booklets covering specific phases of ZINC Die Castings.

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

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FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 105 or 106.

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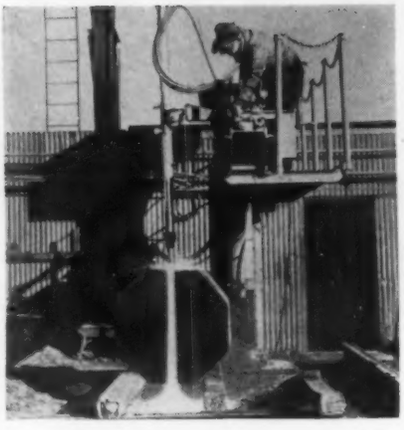
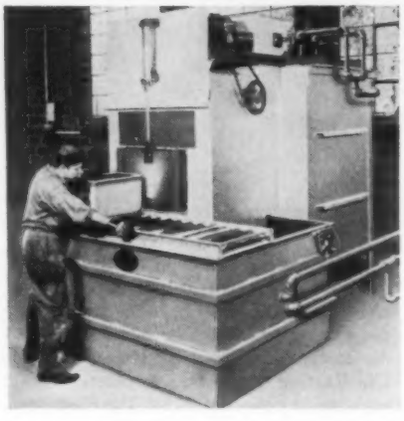


Efficient cutting prepares scrap faster

Rapid, on-the-site cutting of scrap shapes to size is made possible with a heavy duty oxyacetylene cutting blowpipe mounted on an adjustable positioning rig. Large shapes can be reduced easily and economically, making it profitable to process such scrap. Cast iron, stainless and alloy steels, as well as other nonferrous scrap, can also be cut rapidly using the C-60 cutting blowpipe and the powder cutting process. Powder cutting employs an iron-rich powder which raises the oxyacetylene flame temperature high enough to melt and cut such special steels and alloys. The machine features variable cutting rates for different thicknesses and types of scrap. Simplified vertical adjustment of the blowpipe handles irregular scrap shapes efficiently. *Linde Air Products Co.*

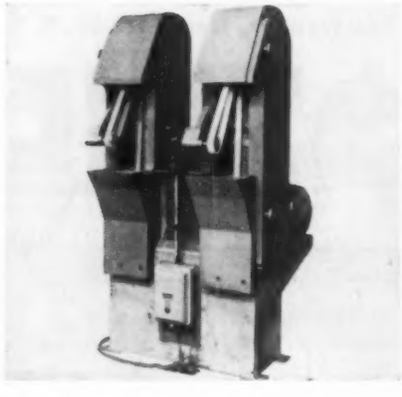
For more data insert No. 18 on postcard, p. 105.



Pitless furnace heat treats 500 lb of work per hr

A small, pitless batch-type controlled atmosphere furnace for production gas cyaniding, gas carburizing, clean hardening and carbon restoration is completely mechanized and self-contained for ease of operation and simplified material handling. It heats 500 lb of work from room temperature to 1500°F in 1 hr provided the furnace is stabilized at control temperature when the load is introduced. Uniform, rapid heating of the Model G is accomplished by 4 radiant tubes fired with Dow burners. A gas generator system of catalytic type is incorporated within the radiant tubes to supply a gas neutral to medium carbon steels. Generator gas can be analyzed before going into the furnace. High volume fan assures directed flow of atmosphere through the furnace load. Quenching is done directly from the furnace vestibule. *Dow Furnace Co.*

For more data insert No. 19 on postcard, p. 105.



Grinds and finishes various types bucket blades

This machine is specially designed for grinding and finishing bucket blades using abrasive or felt belts by the offhand grinding method. It is equipped with extended housings to mount platen rolls to 4 in. wide, and ball bearing spindles for contact wheels up to 1 in. wide x 3 in. diam. Spindles are located at a comfortable working level and permit a 190° wrap of the belt at point of contact. Contact wheels are formed to match the coutour of various types and forms of blades. Single or duplex models are available. If different grit belts are required the duplex machine may be so equipped and the operator can perform the two operations on the one machine. *Production Machine Co.*

For more data insert No. 20 on postcard, p. 105.

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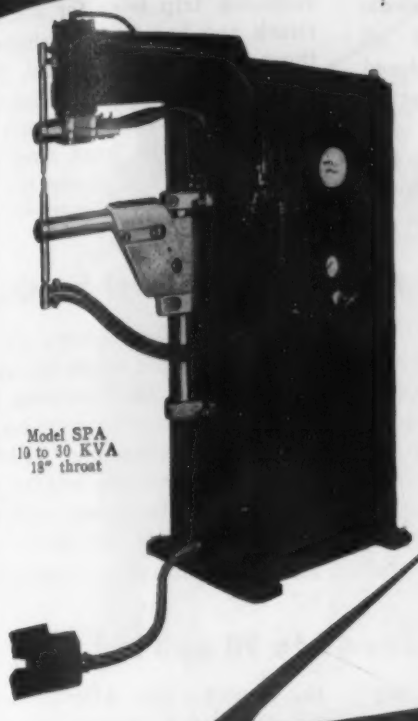
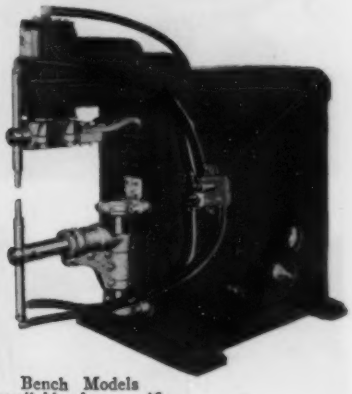
SPEED WITH ACCURACY



Model SPA
10 to 30 KVA
18" throat

Model SPA
10 to 30 KVA
12" throat
4" cyl.*



Bench Models
(available for specific requirements for bench mounting.)

*For special application with double acting cylinder and hand valve (for tip dressing). Also available in 30" throat.

Banner SPOT WELDERS

MODEL SPA SERIES
10-15-20 and 30 KVA

do the job faster — and better . . . special design and construction features raise plant production and efficiency.

ONLY BANNER OFFERS ALL THESE FEATURES . . .

★ BANNER Welders can continuously and accurately weld up to 225 *spots a minute.*

★ Time tested proof of a Banner development is the unique design of ram and cylinder and the *long bearing surface of 7".*

★ Up to 7" adjustment on lower knee.

★ Heavily ribbed cast iron head, with integrally cast cylinder *provides utmost rigidity.*

Manganese Bronze piston specially equipped with 3 cast iron double seal (automotive type) rings. *Reduces friction* up to 50% thus permitting necessary follow up *after* welding cycle.

★ Pin and slot arrangement *prevents piston from turning.*

★ Piston actuated by foot switch and *solenoid operated air valve.*

★ Heavy duty selector (with contacting pads of ample cross section) provide 8 *stages of heat regulation.*

★ All current carrying members are designed for *over load capacity* and made of high conductivity copper alloy.

★ Secondary and secondary pads are *water-cooled* assuring dissipation of heat in the horns and laminated shunt.

★ Frame is ¼" *boiler plate.*

Specific data sheets and catalog available. Write today!

Banner manufactures a complete line of Gun, Seam, Rocker Arm and larger Press Welders and Specials to 200 KVA. Inquiries invited.

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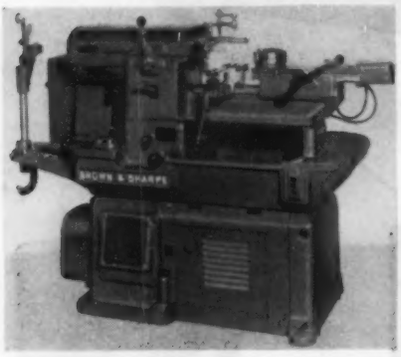
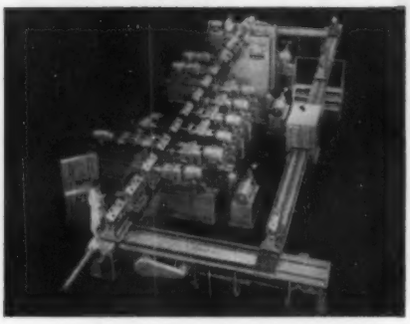


Fast producer on bar stock and second operation

New hand screw machines are designed to cover the field of the former wire feed screw machines. Full-antifriction-bearing spindle has positive chain drive at all speeds and a completely enclosed drive similar to B&S automatics. 196 two-speed combinations are provided with ratios of high to low speeds from 1.6:1 to 13:1. Speed changes are made by simple pick-off gears. The quick-operating c lever spindle control and mus room-top trip lever for automat chuck and bar feed are similar t those in wire food machines. Fe tubes, feeding fingers, collets a many tools from the automatics ca be used on the hand screw ma chines. *Brown & Sharpe Mfg. C*

For more data insert No. 21 on postcard, p. 1



New Transfer-matic machines flywheel housings

Flywheel housings are machined completely except for disk grinding three faces on a new special machine tool. Automatic part transfer mechanisms and other features enable only two unskilled operators to produce 138 flywheel housings per hr at 100 pct efficiency. The machine has 13 stations: one for loading; one f milling; one for rough boring; o for drilling and chamfering; tw for tapping; one for finish boring and one for unloading. Palletize workholding fixtures hold the par during operations and movem between stations. *Cross Co.*

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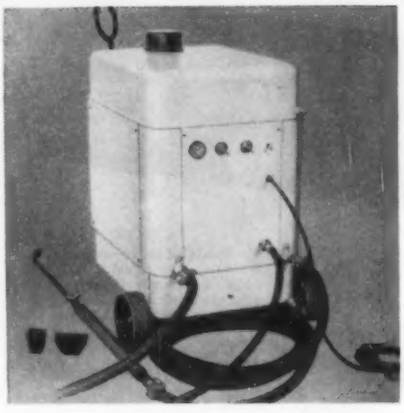
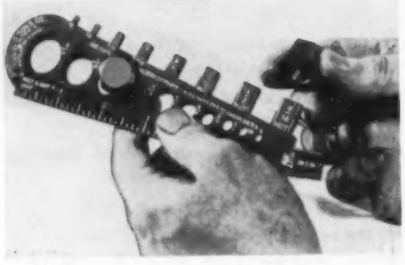


Steam cleaner produces 45 to 90 gph hot spray

A steam cleaner that works on any steam supply of 60 to 150 lb pressure, remove grease and dirt from machinery, equipment, floors, etc., is said to clean 8 to 10 times faster than hand cleaning methods. It mixes steam supply with positive pumped proportions of water and cleaning solution for cleaning, sanitizing, deodorizing. Portable, the Fireless can be rolled right to the cleaning job. After connectin to steam and water supply line and 110 v 60 cycle ac lighting cir cuit, a flick of the starting switc produces boiling hot chemical vap spray. Unit, including 25 ft vapor hose, cleaning gun wi nozzle control system and nozzle weighs 240 lb, measures 37x27x in. *Homestead Valve Mfg. Co.*

For more data insert No. 23 on postcard, p. 1



Bolts and nuts can be gaged quickly

A new lightweight pocket style bolt and nut gage is made of hard, wear-resisting Polystyrene plastic. It will gage bolts and screws from No. 8 to ¾ in. diam, nuts from No. 8 to ⅝ in. diam. Bolts are gaged by pushing them through the size holes and nuts by dropping them on the plugs on the top edg of the gage. The plug gages te diameter of the nut and whethe it is coarse thread (U.S.S.) or fin thread (S.A.E.). The tool is ac curate to 0.005 in. tolerance *Sorrell & Sons Co.*

For more data insert No. 24 on postcard, p. 1

Feed-in duct has new joint design

With the new joint, it is no longer necessary to match left and right hand duct ends of feed-in ducts. All ends are identical in construction; mating is not required to hang the duct correctly. Factory installed joint bolts face outward for accessibility. Only tie plate and nuts are needed to complete th joint. Capacities are 600 to 400 amp. *Square D Co.*

For more data insert No. 25 on postcard, p. 1

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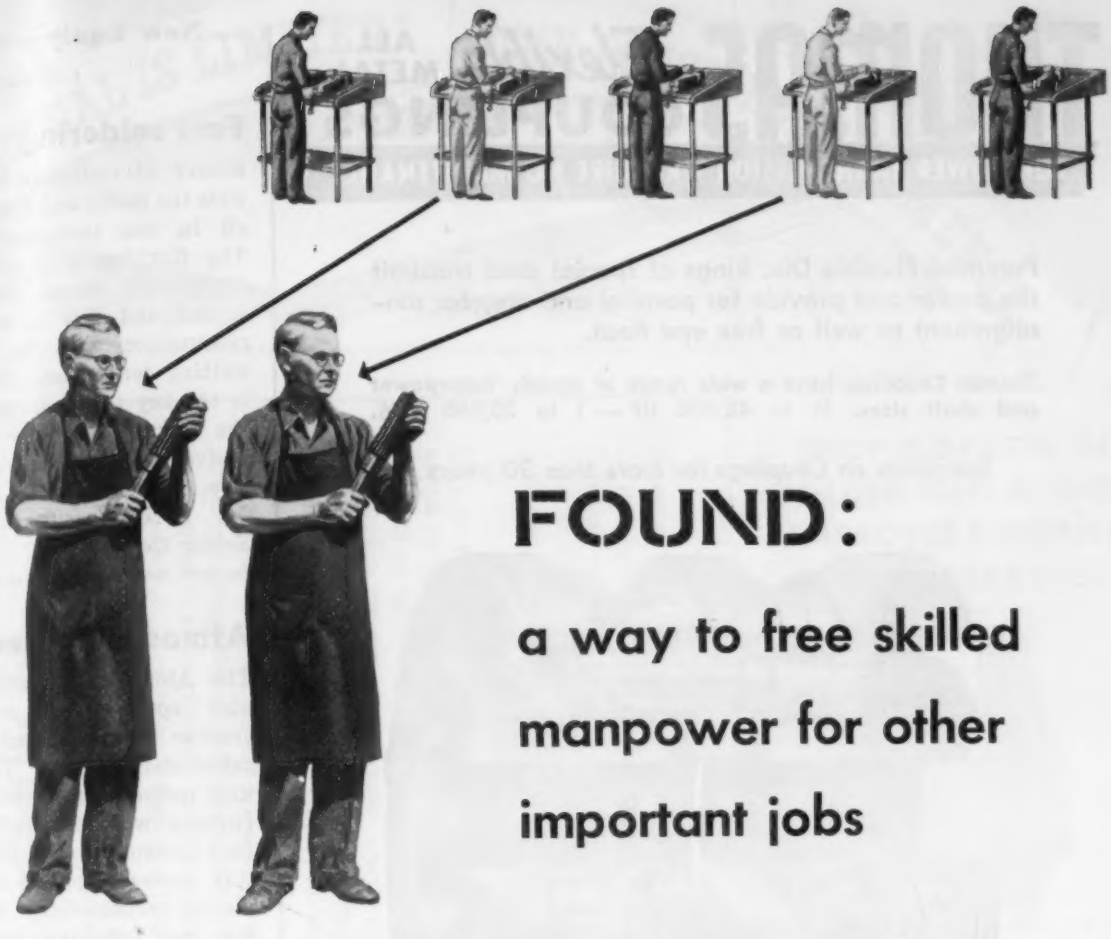


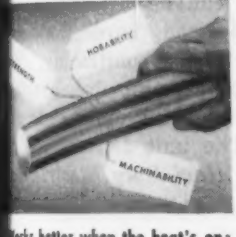
FOUND:

a way to free skilled manpower for other important jobs

Today many companies have found a way to use both manpower and equipment more effectively, through Carpenter's **A**pplication **E**ngineering **S**ervice.

A·E·Service is Carpenter's way of working alongside customers . . . helping them apply specialty steels to get maximum output from men and machinery. **A·E·S**ervice starts with the first bar labeled "Carpenter" you order. The bar is earmarked to do a specific service, like reducing production steps to free manpower, or making possible better products for more sales. That's why the Carpenter man probes *deeper* for facts on each job. He's after all the data he can get to apply the one steel best fitted to your needs. These goals represent a challenge we can't resist.

And **A·E·S**ervice is more. It's backed by field engineers rendering on-the-job service. It gets its vitality from a pioneering staff of laboratory specialists. These are the men responsible for many metallurgical "firsts" that have enabled Carpenter customers to be *first* with new products, and unusual, cost-saving methods. This is **A·E·S**ervice. Count on it to *continue* to work for those it serves.



Works better when the heat's on: "Give us a die casting die steel that fabricates easier and works better at elevated temperatures!" **A·E·S**ervice answered the need with Super Samson, the first die steel to combine good hobability, machinability and strength at high temperatures.

A closer fit with stainless: Few rejects, long tool life and high product quality result from stainless steel engineered to the job. To give Carpenter customers these advantages, **A·E·S**ervice came up with a new idea . . . Stainless *Servistrip*, providing closer hardness limits, better ductility, cleaner blanking.

keeps you ahead of competition

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THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years

PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated. LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

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NO MAINTENANCE PROBLEMS.

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ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

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—New Equipment—

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Fast soldering

Kester 44 resin-core solder mel wets the metal, and flows or spre all in one instantaneous actio The flux has a free-flowing te dency that causes the solder spread and flow in simultaneo conjunction with its fusion a wetting tendencies. This mobili is the key to the instant-action the flux. The solder is non-co rosive and electrically non-condu tive. It conforms to Army-Nav Air Force specifications. *Kest Solder Co.*

For more data insert No. 26 on postcard, p. 1

Atmosphere generator

The Atom-Gen atmosphere gene ator consists of an ammon cracker that is housed in a fabr cated steel cabinet. The comple unit includes an electric tube typ furnace with automatic temper ture control, catalyst filled alloy re tort, necessary piping and flow reg ulation accessories. Atmosphere for the following heat treatin operations can be provided: Clea non-decarburized hardening, dr cyaniding or carbonitriding, ca burizing, copper and silver brazing nitriding, sintering and bright an nealing. The unit delivers 150 c ft per hr. *Hevi Duty Electric Co*

For more data insert No. 27 on postcard, p. 1

Re-designed front axle

The design of a new front axl assembly in the Caravan line o four-wheel running gear features turning radius of 45°, dependin upon track width and spring loca tion. Greater stability is obtaine by heavier overall construction an incorporation of extra-heav 1¾-in. center arm stops. These au tomotive type assemblies have ca pacities ranging from 10,000 t 12,000 lb and are recommended fo applications where maximum sta bility is required such as handlin air compressors, heavy-duty gen erators, pumps, tar kettles, concret mixers, military field units an other mobile equipment. *United Mfg. Co.*

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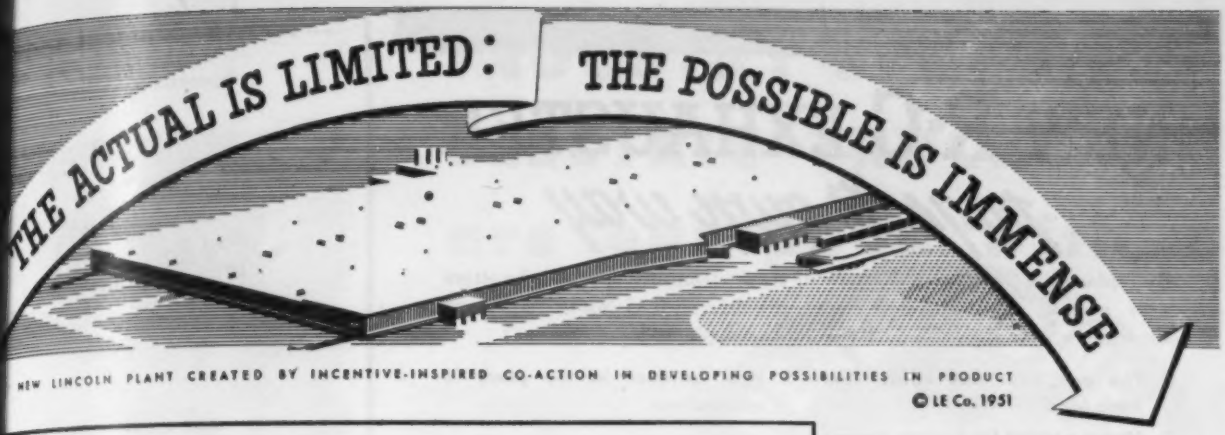
THE ACTUAL IS LIMITED:
THE POSSIBLE IS IMMENSE
NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT
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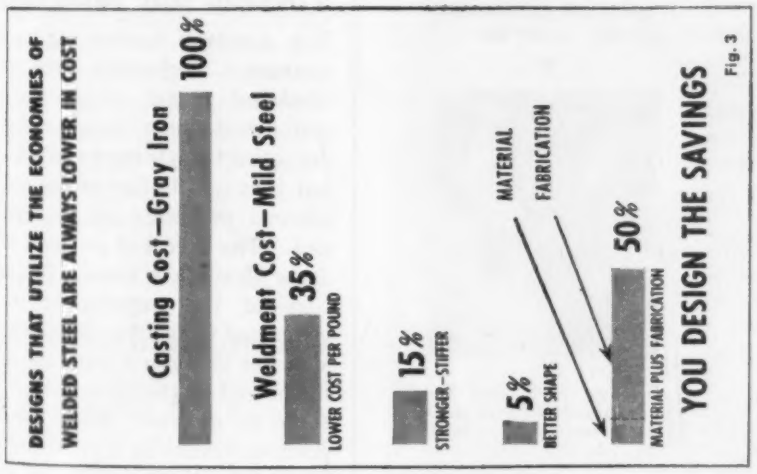
Welded design builds stronger products ...at half the cost

THE proper use of welded steel strengthens the construction of many products while cutting costs 50%.

As shown in Fig. 3, a simple duplication of a design in mild steel generally reduces material costs to as little as 35% of traditional gray iron construction. However, when designs utilize the inherently greater strength and rigidity of steel, still fewer pounds of metal are required and material costs can be cut to 15%. Ultimately, the efficient use of formed engineering shapes from sheet or plate can eliminate further metal, cutting the material expense to as low as 5%. With these substantial savings in material costs, the designer has a latitude of 35% to 45% in which to fabricate and still realize overall cost savings of 50% in the manufacture of his products.

Whenever weldment costs do not approximate this yardstick, designs generally are falling short of incorporating the full economies of welded steel. A Lincoln Welding Engineer will gladly demonstrate how you can benefit on present and future product developments. Call or write.



PROPER DESIGN IN WELDED STEEL ALWAYS IMPROVES PRODUCT AND LOWERS COST

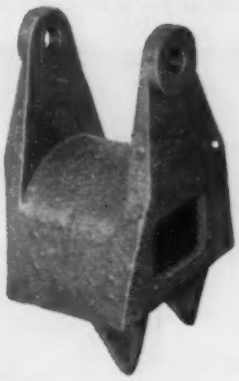


Fig. 1—Original Construction *of hanger. Cost....$5.20. Weight 18 pounds.*

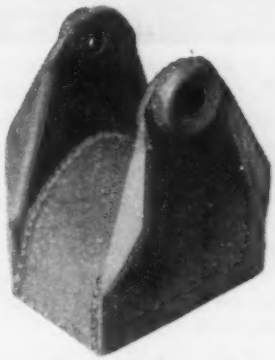


Fig. 2—Present Weldesign in Steel *Saves 52% in cost. Costs....$2.50 Weighs 12 pounds.*

Photos courtesy Dorsey Trailer Company, Elba, Alabama.

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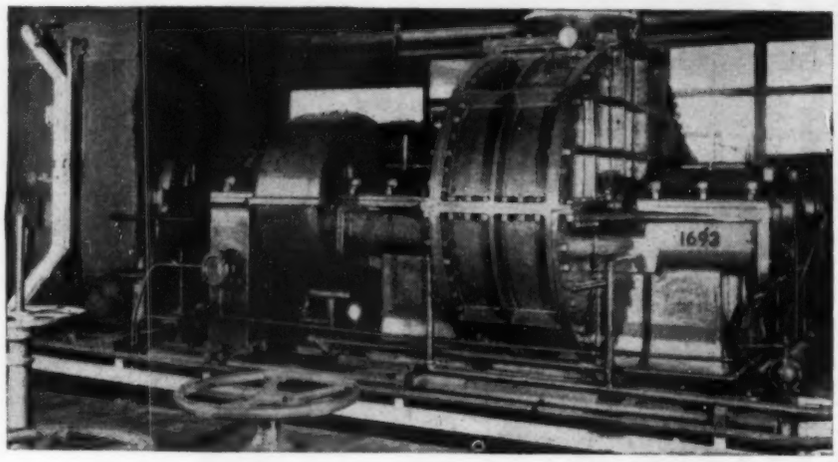
pays its own way

By replacing a 30-year-old battery of three steam-driven gas exhausters with a new, high-capacity, electrically-driven R-C unit, important advantages were gained, in a large industrial plant:

1. **The one new unit carries the base load.**
2. **Steam needed for 5 other steam-driven exhausters, carrying partial load, is substantially reduced because of slower speeds.**
3. **Heat balance in the plant is maintained.**
4. **Savings in total power cost will pay for the new installation in about one year.**

These very satisfactory results were obtained by careful evaluation of all the factors before deciding upon the type of equipment . . . and then by specifying an R-C Rotary Positive Gas Exhauster that will do the work at low operating cost.



Type RCGH Rotary Positive Gas Exhauster, driven by 450 hp synchronous motor. Capacity, 20,600 cfm.

Even though your equipment to handle gas or air may still have years of life, it may be sound economy to replace it with modern, efficient, R-C units of the right type, size and drives to best meet your needs. Our engineers will help you analyze your problem and make unbiased recommendations of either Rotary Positive or Centrifugal equipment, depending upon your specific conditions. This *dual choice* is an exclusive R-C advantage.

With capacities from 5 cfm to 100,000 cfm, R-C units can be closely matched to work requirements, for dependable, economical performance. At Roots-Connersville, almost a century of blower building experience is at your service, without obligation.

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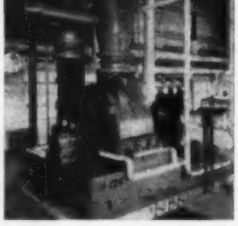

2-stage Centrifugal Exhauster for coke oven plant of Canadian steel mill. Capacity 16,340 cfm.

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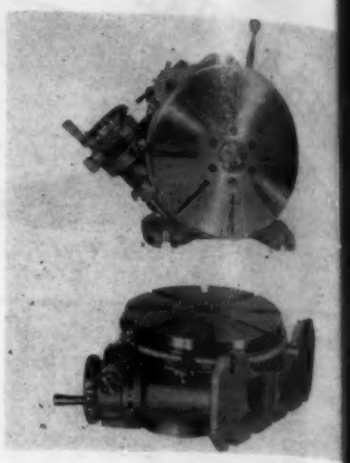
ONE OF THE DRESSER INDUSTRIES
BLOWER BUILDERS SINCE 1854



Rapid setting

High accuracy and rapid setting are claimed for a new optical indexing table for use with milling machines, jig borers, die sinkers and similar machines. The table may be used in a vertical or horizontal position. A high precision engraved glass degree scale is observed directly through a compact telescope which, in conjunction with circular dial, makes possible readings accurate to 0.0005 in. at periphery of 12 in. circle. Reading is made at a normal viewing distance. *T. Griswold Mfg. Co.*

For more data insert No. 29 on postcard, p. 10

Torsion bar load cell

The Atcotran torsion bar load cell changes a mechanical force into an electrical signal. This new precision instrument consists of a differential transformer and a torsion bar that is held fast at one end and allowed to rotate on the opposite end. The free end connects to the force through a lever. The armature of the transformer is also connected to the free end of the torsion bar through a lever and moves in the coil of the transformer when force is applied. Each armature position results in a generated electrical signal propositional to its position off center. The signal may be fed into a remotely located indicator or recorder for evaluation. *Automatic Temperature Control Co., Inc.*

For more data insert No. 30, on postcard, p. 10

Vari-speed motordrive

Designated as Model No. 8000, the new unit has a capacity of 25 hp and is available in all speed ranges from 2:1 to 6:1. It is a complete self-contained variable speed power plant, combining in a single space-saving unit the Reeves speed-varying mechanism, the user's choice of any standard constant speed motor, and a built-in helical gear reducer, when low output speeds are required. Horizontal and vertical models are offered with handwheel controls as standard equipment. Electrical or automatic hydraulic controls are also available. *Reeves Pulley Co.*

For more data insert No. 31 on postcard, p. 105.

Plastic goggle

Made of plastic, a lightweight protecting goggle affords wide angle vision and may be worn over prescription glasses. One-piece construction with molded rubber binding fits natural contours of face. The elastic head band insures a snug fit and all day wearing comfort. *General Scientific Equipment Co.*

For more data insert No. 32 on postcard, p. 105.

Indentification markers

A quick and inexpensive method of identifying aircraft fluid lines uses self-sticking tape markers. These are made of durable cotton cloth with a silicone plastic coating for protection against dirt, grease, grime, moisture and abrasion. They come mounted on handy dispenser cards. *W. H. Brady Co.*

For more data insert No. 33 on postcard, p. 105.

Turn Page

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Continued

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For installation on discharge lin of air and gas compressors, th PPC aircheck valve is said to ab solutely safeguard against the for getfulness of operating personne to open a valve when starting th compressor. Advantages are four fold: dispenses with customary ar rangement of stop, safety, an globe valves; prevents leakage o pressure through the compresso during the off cycle; dampens pip line pulsations; permits repair without shutting down the syste where more than one compresso is on the line. *Pennsylvania Pum & Compressor Co.*

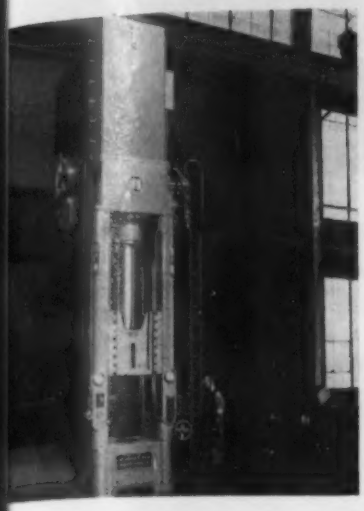
For more data insert No. 34 on postcard, p. 10

DC welder

Field testing has shown a new d welding machine to be free of stack failure. This is accomplished by directing a high velocity down draft of cool air over the rectifier stacks before passing this air through other parts of the machine. The blast is expelled at the base of the welder. This assures proper cooling, while promoting interna machine cleanliness. As in the company's heavy duty ac welder, the dc welder has the case-diameter fan and wind tunnel design and primary coils are raised and low ered easily on ball bearing jacks. The machine is available in 200, 300 and 400 amp ratings. *A. O. Smith Corp.*

For more data insert No. 35 on postcard, p. 10

Turn Page



Speeds cartridge cases

Designed to speed up the manufacture of cartridge cases to meet ordnance demands, an all-hydraulic 150-ton, deep draw press is one of 80 presses of this type now in production. The press is equipped with 30x30 in. platen, has a 72 in. stroke and offers high pressing speed of 215 ipm. Powered by H-P-M's fast traverse, all-hydraulic power system, the 150-ton unit features high speed cycles, with rapid advance to the work, automatic slow-down as die contacts work and rapid return for the next cycle. *Hydraulic Press Mfg. Co.*

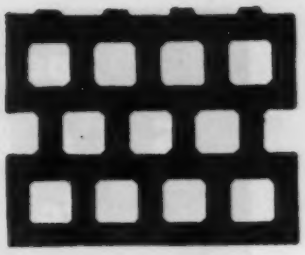
For more data insert No. 36 on postcard, p. 105.

Insulation tester

A new industrial electronic surge comparison tester is used to locate insulation faults, and winding dissymmetries in motors, ac and dc generators, transformers, and coils. Available in mobile or portable models, it has adequate surge voltage characteristics for most insulation tests. The tester simultaneously tests turn-to-turn, phase-to-phase, and coil-to-ground insulation with potentials high enough to simulate power circuit transient stresses. Non-destructive testing is assured even on fractional horsepower motors and generators, and destructive fault location is possible in many cases. *Westinghouse Electric Corp.*

For more data insert No. 37 on postcard, p. 105.

Perforated metal screens *for any requirement*



WITH facilities for producing any shape and size of perforations in any commercially rolled metal, of whatever gauge desired, Hendrick can furnish the most suitable form for a specific screening application.

To best meet certain requirements, Hendrick developed the "squaround" perforation illustrated. Other standard forms include round, square, hexagonal, diamond and slot perforations in hundreds of sizes of openings. Write for full information.

1876—Seventy-Fifth Anniversary—1951

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One-man Operation; Positive Control; Quick, Accurate Positioning

Where runs are too short to justify the use of a spacing table, or where irregular plates must be handled, this modern Thomas Duplicator is ideally adapted. It affords rapid, precision duplication of holes, notches or slots, and will speed production in car-shops, bus and truck building plants and in numerous other fabricating operations in varied industries.

Write for Bulletin 312

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1A

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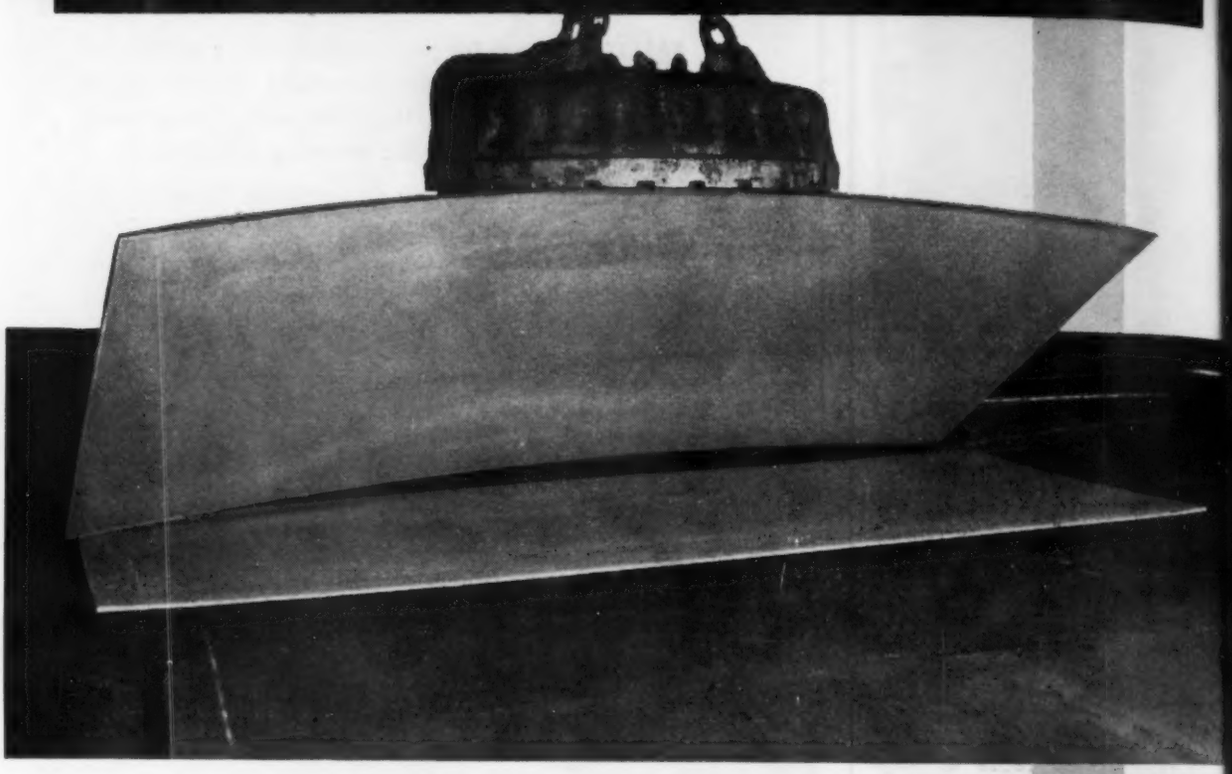
Specify C. F. & I. "Ferro Bond" STAINLESS-CLAD STEEL for quality and resistance to corrosion

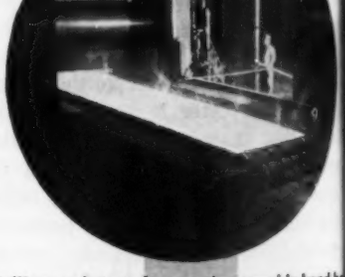


Separation of plate into two Stainless-Cl plates by electromagnet after rolling.

Substantial savings in cost, plus extra strength and long life recommend the use of C. F. & I. "Ferro Bond" Stainless-Clad Steel for numerous purposes where high resistance to corrosion is essential.

C. F. & I. Stainless-Clad Steel (a composite of carbon steel and stainless steel inseparably bonded together) is produced under close quality control... rolled with painstaking care under specialized supervision to insure absolute uniformity of the stainless steel cladding.

For additional information on the production savings possible with C. F. & I. Stainless-Clad Steel and the many applications where it can be used to good advantage, write to Claymont Steel Corporation, Claymont, Delaware.



Rolling a plate to form an inseparable bond b tween carbon steel and stainless steel cladding

C|F|I Large Diameter Steel Pipe... Carbon Steel Plates... Flanged and Dished Heads

STAINLESS-CLAD STEEL

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Washington Officials Setting Steel Market Pace

They can make any item tighter or easier by changing manufacturers' production schedules . . . Controls invite inflated statements of demand . . . Steel wage outlook grows darker.

Important steel users who used call on steel company heads for lp are now seeking their steel Washington. They are going ere in droves. Some get help, me don't. But they keep going. quests for steel are running far ead of availability.

Steel users, big and small, the med forces, politicians, lobbyis, and other government agency icials are making things hot for National Production Author- and Defense Production Adnistration. These officials have come the pivotal control of the el market.

Pacemaker—The relationship of pply to demand has little influce in today's steel market. What ems steel producers want to ake and sell, and what consumwant to buy make little differce. Washington officials decide at will be made and how much. is is true of civilian goods, as ll as military.

That's why the recent easing of me steel products has caused rdly a stir in the industry. Many el executives believe the easing cold-rolled sheets, for example, due solely to government regution of auto makers' production.

Twist of Wrist—Under present rict controls any steel product n be made tight or easy merely raising or lowering manufacrers' production schedules in ashington. Such action in no way flects real steel demand.

In view of their unprecedented oduction pace, steel industry aders believe there is no real ed for complete government ntrol over steel distribution. They expect to turn out about 105.1 million net tons of steel this year. Except for last year, that's over 15 million tons more than was made in any previous year, including peak production during World War II.

Paradox—Some believe that controls have made the steel shortage seem worse than it is. This claim is not easily shrugged away. In many instances steel companies know almost exactly how much steel their customers can use; they know because they have been serving them for years. Yet, some of these customers have asked for more than twice as much steel as they have ever used before. Field interviews by IRON AGE editors have revealed the paradox of some manufacturers operating at or near capacity, yet admitting that their steel requests had been drastically slashed.

This is the cause of the most bitter complaint against controls. No one, except harried controls officials, blames manufacturers too much for trying to get all the steel they can. But the case against controls in a half-mobilized economy is gaining momentum because they invite highly inflated, unrealistic expressions of demand.

Stress and Strain—This much is certain: Full allocation of basic materials by Washington has given the U. S. economy another violent twist. Historic market factors won't mean much as long as these controls are in force. And the end isn't in sight.

Reports of failing demand for gray market and conversion steel have had no noticeable effect on mills' order books. Customers are still trying without success to place orders for the limit of their CMP tickets permit. Cancellations are negligible. One auto company which could place orders for only 40 pct of its CMP tickets is planning to curtail production still further, rather than buy more expensive conversion steel.

Labor Threat—This week prospects of an early wage agreement in the steel industry do not look bright. United Steelworkers of America have formulated a long list of demands which they will present to steel companies, though they admit their "substantial" wage request will be a "negotiable" figure. Union is firm in its intention to break through the wage ceiling and appears determined to strike if companies will not grant sizable increase.

Steel companies are just as determined not to grant a wage increase unless they are permitted to raise prices. This sets the stage for another Washington "solution" to the wage problem. Dispute may be handed over to the Wage Stabilization Board—or there may be another steel fact finding board. Meanwhile, it will be up to the President to keep the steelworkers pouring steel for defense.

Ingot Rate Jumps—Steelmaking operations this week are scheduled at 103.5 pct of rated capacity, up 2.5 pct from the previous week.

Operations are expected to continue above rated capacity for the remainder of the year—provided labor trouble can be kept at a minimum. For the past 2 months labor has displayed its anxiety over contract negotiations scheduled to begin next week. A series of unauthorized wildcat strikes have hampered production in several districts.

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- CORROSION RESISTANT STEELS
- HIGH-TEMPERATURE SERVICE STEELS
- MECHANICAL AND PRESSURE TUBING

GLOBE TUBES

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Market Briefs

still in demand — Softness in the steel market as evinced by the retreat from conversion is not yet apparent in the steel mills. Customers are still making aggressive efforts to line up mill steel. In most cases, pressure for steel is strong. Conversion brokers are turning most of their efforts to making bar steel arrangements and supplying ingots which can be rolled into plates. There are still some takers for conversion ingots—but few of them are big automotive firms.

price rise — U. S. Steel Export Co. has announced increases in export base prices of galvanized products. New prices reflect the 2¢ per lb increase on slab zinc authorized by OPS on Oct. 2.

beam source — Barium Steel Corp. announced last week that its subsidiary, Phoenix Steel Co., is now rolling wide flange beams on a 24-in. structural mill. Announcement followed close upon reports of Kaiser Steel Corp.'s successful conversion of a 29-in. mill to this type of production. (THE IRON AGE, Nov. 15, 1951, p. 77).

one coat — New process permitting the application of a single coat of titania-opacified enamel directly to enameling iron and many cold-rolled steels has been developed jointly by Republic Steel Corp. and Ferro Corp., Cleveland. The necessity of a ground coat and/or premium steels is eliminated.

white collar raise — Westinghouse Electric Corp. and the Federation of Westinghouse Salaried Employees have reached agreement on a pay increase for 15,000 white collar workers. Increases are equivalent to 5 to 10¢ an hr counting other contract improvements. Terms are subject to ratification by members and the union executive council.

cheap titanium?—A continuous electrolytic method for the reduction of titanium chloride has been developed in the laboratory by Arthur J. Kerbecek, Jr., a graduate student at Columbia University, it is reported. A pilot plant is planned in order to determine the purity and cost of producing titanium by Mr. Kerbecek's method under industrial conditions.

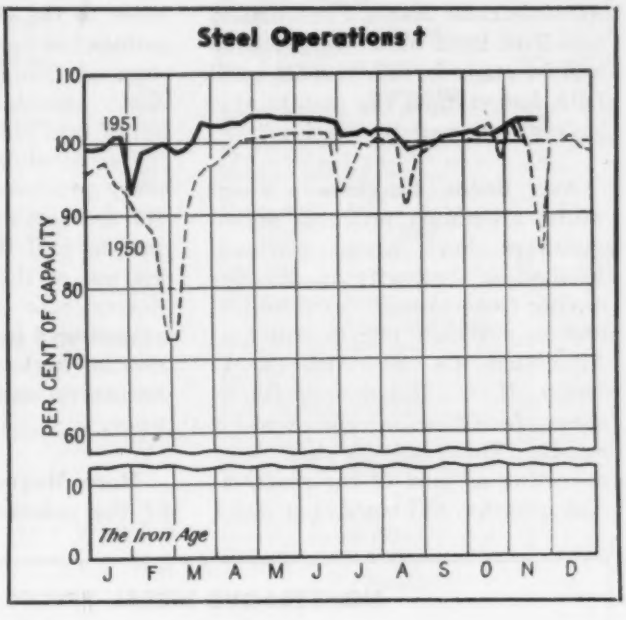
ore program—Ford Motor Co. and Cleveland Cliffs Mining Co. will begin immediately an ore concentrating program that will ultimately produce 400,000 tons of high-grade iron ore annually. The plant will be located in the Marquette Range, Humbolt, Mich.

against raise—Government agencies are joining with industry in opposition to a further freight rate boost amounting to between 7 and 8 pct which railroads have asked of Interstate Commerce Commission. Lining up in opposition to rate increases at this time are Office of Price Stabilization, General Services Administration, Dept. of Commerce, and Tennessee Valley Authority.

copper clad — Before long auto radiators may be made of copper clad steel. The product would contain about 80 pct steel and 20 pct copper. It would be made by a Midwest producer under license from another firm. The same type material will be used for manufacture of small ammunition.

contract talks—United Steelworkers and U. S. Steel Corp. will open contract talks at 10 a. m. Nov. 27 in Pittsburgh. Philip Murray will head the union negotiating committee of 40, and John Stephens a company group of about 30. Negotiations with other producers probably will also begin next week.

Sears autos—Sears Roebuck & Co. plans to sell low-priced autos in the South and Southwest before Christmas. Cars will be made by Kaiser-Frazer at its Willow Run plant and will be similar to the Henry J. Sears' model will be called the Allstate.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Nov. 11	103.0*	105.5*	103.0	101.5	108.0*	104.0	96.5*	105.0*	102.0*	75.0	98.5	91.0	101.5	101.0
Nov. 18	103.0	107.0	104.0	101.5	106.0	104.0	99.5	108.0	102.0	80.0	98.5	91.5	103.0	103.5

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.
* Revised.

Future Expansion Decision Nears

Aluminum expansion program within 30,000 tons of defense goal... DPA studies question... Justice Dept. may seek more small producers . . . Set antimony ceiling—*By R. L. Hatschek.*

Decision will be made about the first of the year as to the extent—if any—of further aluminum production capacity. Signing of the Anaconda Copper Mining Co.-Harvey Machine Co. agreement will bring aluminum capacity, when completed, to within 30,000 tons of the originally scheduled 1.5 million-ton defense goal.

End Expansion?—Some officials have stated that the Anaconda-Harvey arrangement would mean an end to further aluminum expansion approvals, leaving more materials for other expansions. "This certainly doesn't reflect my thinking," Defense Production Administrator Manly Fleischmann told THE IRON AGE. "No decision will be made in this respect until DPA has studied the results of a survey it is now completing."

Ask Badin Purchase — Meanwhile, aluminum products manufacturers have urged National Production Authority to consider having General Services Administration purchase idle facilities of Aluminum Co. of America at Badin, N. C. Rated capacity of these facilities is 800 tons a month. The facilities had been operating as part of the reactivation program but were shut down recently because of the unavailability of even high-cost power.

Washington power and production officials are cool to the proposal because of the uneconomic nature of the operation. Industry advisory committee members have recommended the use of diesels and other equipment for emergency power.

Aluminum Scrap Needed—NPA has been asked by aluminum producers to try to hustle up some more scrap. Auto wreckers, it is felt, could probably turn in a lot more pistons and other aluminum parts. Another request was to have Office of Price Stabilization issue a strongly worded statement to the effect that scrap aluminum prices will not be increased. The point here is to eliminate speculation and get more scrap into circulation.

Use of aluminum scrap by primary producers has been limited for the rest of the year in an effort to pull the secondary smelters out of their bad position. Industry also suggested that the government buy any foreign or domestic high-cost metal and, if necessary, resell it at the market price.

More Magnesium Makers—One of the points brought up before the Magnesium Assn. meeting l week (see p. 43) was that the dustry needs some new produc in order to prevent governm charges of monopoly against single private producer. Tr busters are still at work on aluminum industry and high mands placed on magnesium p duction by the Korean war ever-increasing civilian use boosting this industry to where will soon make a prime target.

It is hoped that some of companies which are now turni out magnesium in governme owned plants will be able to t them into economically compe tive operations and then buy the One producer in a rapidly gr ing basic metal industry j won't be enough for the Just Dept. if we can judge by past p formances.

Set Antimony Ceiling—Eff tive yesterday, both domestic imported antimony prices are at 49½¢, 50¢ and 50½¢ per f.o.b. shipping point, depending grade, in carload quantities. D ferentials ranging from 1½¢ 8¢ for producers and from 2 to 10¢ for importers and deale are allowed on l.c.l. shipments well as a ½¢ premium for spec packing in cases or boxes. A mony oxide and other chemic also fall under Ceiling Price Re ulation 96. Office of Price Stabi zation expects this to provide centive for expanded domes antimony production.

New Order Coming—OPS currently at work on a new set specific ceilings for zinc and le A few sellers are over the quot market prices because the mo recent orders allowed 2¢ per increases over the General Pri Order which froze sellers at di ferent levels. A fight is shapi up with the Capehart amendme providing ammunition for hig price sellers.

NONFERROUS METAL PRICES

	Nov. 14	Nov. 15	Nov. 16	Nov. 17	Nov. 19	Nov. 20
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.03	$1.03	$1.03	....	$1.03	$1.03*
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

*Tentative

Note: Quotations are going prices.

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MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 41¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 34¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 32¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 28, 56¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ (3.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 higher by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 34¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 37¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 34¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 34¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., ¼; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 1,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅓ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.23 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 5 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to ⅜, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; ¾ to 2 in., 78¢; 0.165 to 0.219, ⅝ to ¾, 84¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1⅜ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $8; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	37.53	....
Copper, drawn	....	38.78	....
Low brass	39.67	39.36	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.20	37.26	38.52
Leaded copper	....	41.58	....
Com'l bronze	41.13	40.82	....
Mang. bronze	46.92	40.81	42.37
Phos. bronze	61.07	61.32	....
Muntz metal	41.18	36.74	37.99
Nickel silver, 10 pct	49.82	52.04	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	50.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	18.80
Lead, New York	19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$216-$218
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	88.00
Tin, New York	$1.03
Titanium, sponge	$5.00
Zinc, East St. Louis	19.50
Zinc, New York	20.20
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	32.25
No. 315	30.25
88-10-2 ingot	
No. 210	40.00
No. 215	38.50
No. 245	33.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅝
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.35
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19½	17⅞
Red brass	20½	19⅝
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17⅝
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	14¼—14⅝
No. 1 composition	18 —18½
No. 1 composition turnings	17¾—18
Unlined red car boxes	16¾—17¼
Cocks and faucets	15½—16
Mixed heavy yellow brass	12 —12½
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	10 —11

Zinc

New zinc clippings	13¼—13½
Old zinc	10 —10¼
Zinc routings	6¾— 7
Old die cast scrap	6¾— 7

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	15¾—16
Battery plates (dry)	10½—11
Batteries, acid free	7 — 7¼

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	21 —22
Siphon tops	48 —50
Small foundry type	21 —22
Monotype	18½—19
Lino. and stereotype	17½—18
Electrotype	16 —16½
Hand picked type shells	10 —11
Lino. and stereo. dross	8¾— 9
Electro. dross	7½— 8

Air Force Officials Get Scrap Course

Scrap men and Air Force sponsor scrap indoctrination course on collection, segregation of scrap . . . Tour three plants . . . Feel more effort needed by industry in releasing scrap.

Lectures on segregation and collection of scrap metals and tours of dealer preparation yards furnished Air Force disposal officers with an indoctrination course in getting out the scrap.

Both scrap men and top Air Force officials stressed the need for acceleration of collections at a conference held recently at Wright-Patterson Air Force Base, Dayton, Ohio.

Purpose of the meeting was to push Air Force officials more deeply into scrap collection and segregation.

Threat of winter cold was pointed out by Edwin C. Barringer, ISIS vice-president, who said that the potential of scrap in government installations and a number of other places is sufficient to meet peak demand. Promptness in bringing out this scrap is a vital matter.

Scrap dealers outlined the procedures of scrap collection work. Later tours were made of three Ohio scrap yards.

Scrap men say that the Air Force could probably make substantial contributions of nonferrous scrap but that other government agencies, such as the Army and Maritime Commission, could help steel producers considerably by emptying their stocks of dormant iron and steel scrap. More effort is called for.

Steel and scrap men in the industrial scrap mobilization campaign feel that manufacturing plants still have not done their very best in ferreting out dormant scrap from dark corners. Much more is available, they feel.

Some firms have entered scrap collection enthusiastically, while others remain comparatively indifferent.

A further stimulus is needed, scrap campaign men feel. One scrap man suggested that committees be appointed in various districts to tour plants and ask embarrassing questions on why this or that object is not scrapped. The rest would be up to management's conscience.

Pittsburgh—Scrap inventories have fallen off to the desperation point for some mills. Movement of material has slowed for three reasons: (1) Inclement weather, (2) lack of enthusiasm on the part of some dealers to ship, and, (3) maintenance of strict inspection standards prompted in part by a recent visit by four OPS inspectors. A large mill reported that in a recent period its receipts fell off by 110 cars from one week to the next.

Chicago—Mills in the area are losing a little ground due to severe weather and allocations out of the district, which for the most part are about cleaned up. Steel foundries are having a considerably tougher time as low phos grades are extremely scarce. They are receiving some allocations of heavy material. Improvement in pig iron supplies, coupled with reduced foundry operations is keeping demand for cast grades at a low ebb.

Philadelphia — Dealers report little change in this area with fairly good receipts of light material and poor shipments of heavy grades. Mills seem to be a bit better off since they have received no dealer allocations lately. The cast market is tightening up and overgrading is again in evidence. Cold weather is generally cutting into operations.

New York—Scrap collections, especially in heavier grades, were at a poor level. Industrial scrap collections were reported off and fears were expressed that they would sink even more with coming cutbacks in civilian durable production. Threat of really adverse weather is worrying many here. There are a few signs of a winter slowup now.

Detroit—Intensified scrap drives a help but emergency collections c hardly hope to make up for the b cutback for Detroit production scra Estimates by local dealers place t drop in production scrap here at much as 30 to 50 pct from the postw peak. Meanwhile, the local steel i dustry seems to have made up its mi to take what comes.

Cleveland — Heavy snow slow scrap traffic to a near halt this wee Shipments estimated to be down ov 75 pct from peak of month ago. Fee ing among scrapmen is that muc obsolete scrap is still hiding out fabricating plants. Industry still nee more push, they feel. Production scr collections and farm scrap collectio in northern Ohio are very poor.

St. Louis — Purchase of approx mately 20,000 tons of unstripped au tomobile motors from graveyards, b two steel mills in the district ha helped to ease their tight scrap iro situation. Because there is no deman for foundry grades, the motors ar being shipped stripped. Otherwi scrap movement was light.

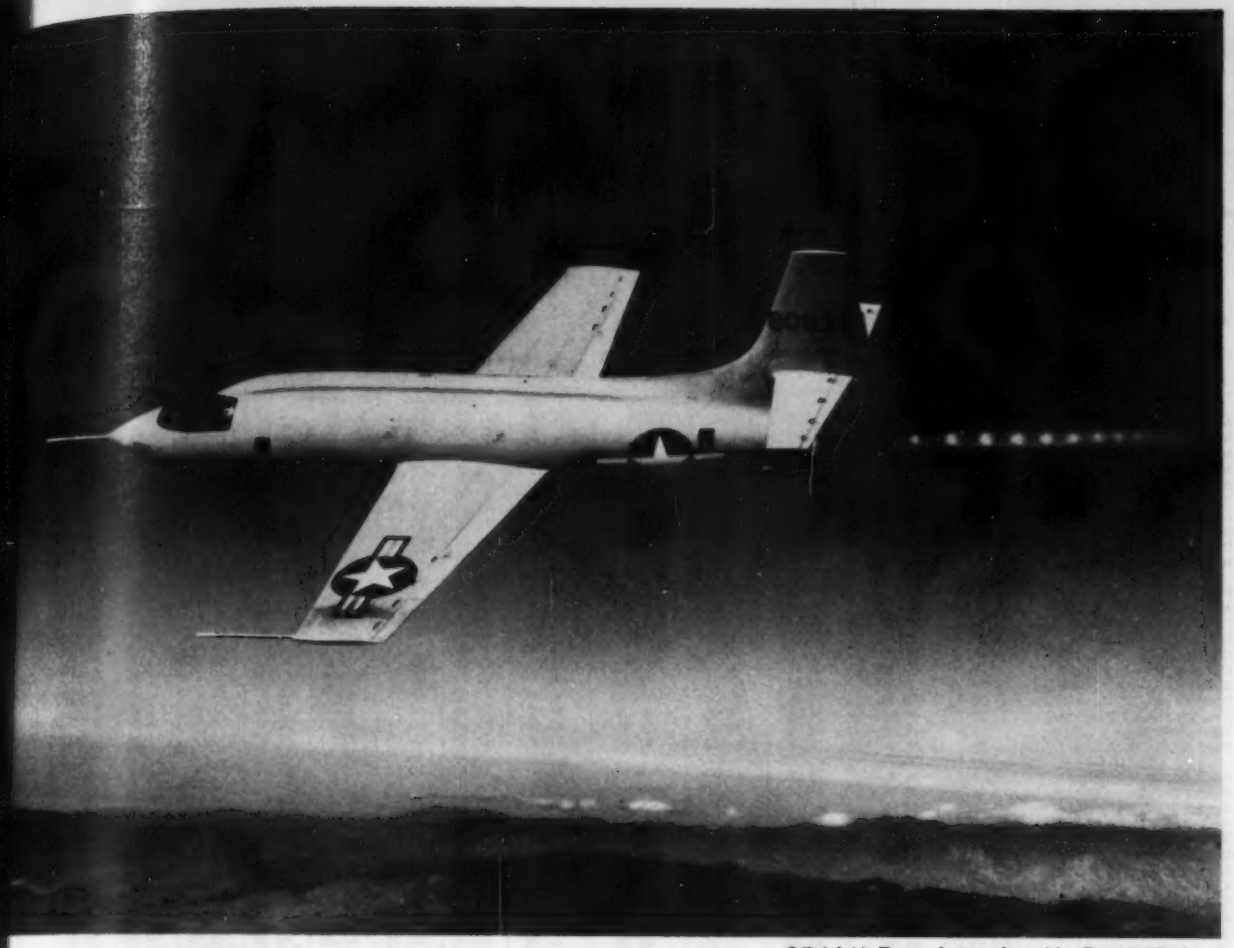
Birmingham—Dealers and broker here say the heavy melting scrap sit uation is in such condition that i changes almost overnight. Two week ago it appeared in good supply, whil last week it was tight again. Thi week there seems to be a fairly goo supply, but by next week it may b tight again.

Cincinnati—Mills here are a littl better off. While freezing weather conditions have hampered collections deliveries to mills have dropped les than about 10 pct below last month' peak. Production scrap is still tigh and cast easy with electric grades al going to Middletown, Ohio, and New port, Ky. Cooperation of few month ago between auto wreckers and scra dealers has ended. Cause is blamed o dealers getting into wrecking busines

Boston—Unclean motors remain th only sluggish item in what appear to be an active scrap market and im proving cast market.

Buffalo—Out-of-district allocation still shrink local stockpiles—now a from 2 to 3 weeks. About three quarters of allocations have bee filled. Some dealers met their quota and are shipping locally again.

UNIVERSITY OF MICHIGAN LIBRARIES



Official Air Force photo, released by Dept. of Defense

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Stainless steel travels faster than sound . . . in the rocket-powered Bell X-1, designed to attain the incredible maximum speed of 1700 miles per hour. To provide more such "weapons of the future" for America's defensive arsenal, stainless *scrap* must travel faster, too . . . to meet the soaring demand for new steel. Keeping this scrap moving to the mills is an industry-wide job . . . and our No. 1 specialty.

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BUYERS of stainless scrap, straight chromes, nichrome, pure nickel, nickel alloys & inconel

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.70	.75	.51	.75	.70	.76	.63	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.51	.83	.67	.88
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Weirton	Youngstown	Canton	Steubenville	Warren	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minneapolis	Houston	Los Angeles, Pittsburg, Cal., Portland, Ore., San Francisco
GRADES	OPS No.																																			
No. 1 bundles	1	$44.00		$44.00		$43.00		$42.50		$42.00		$41.00		$41.15		$40.00		$39.50		$39.00		$38.00		$37.00		$35.00
No. 1 busheling	2	44.00		44.00		43.00		42.50		42.00		41.00		41.15		40.00		39.50		39.00		38.00		37.00		35.00
No. 1 heavy melting	3	43.00		43.00		42.00		41.50		41.00		40.00		40.15		39.00		38.50		38.00		37.00		36.00		34.00
No. 2 heavy melting	4	43.00		43.00		42.00		41.50		41.00		40.00		40.15		39.00		38.50		38.00		37.00		36.00		34.00
No. 2 bundles	5	43.00		43.00		42.00		41.50		41.00		40.00		40.15		39.00		38.50		38.00		37.00		36.00		34.00
Machine shop turnings	6	34.00		34.00		33.00		32.50		32.00		31.00		31.15		30.00		29.50		29.00		28.00		27.00		25.00
Mixed borings and turnings	7	38.00		38.00		37.00		36.50		36.00		35.00		35.15		34.00		33.50		33.00		32.00		31.00		29.00
Shoveling turnings	8	38.00		38.00		37.00		36.50		36.00		35.00		35.15		34.00		33.50		33.00		32.00		31.00		29.00
Cast iron borings	10	38.00		38.00		37.00		36.50		36.00		35.00		35.15		34.00		33.50		33.00		32.00		31.00		29.00
No. 1 chemical borings	26	41.00		41.00		40.00		39.50		39.00		38.00		38.15		37.00		36.50		36.00		35.00		34.00		32.00
Forge crops	11	51.50		51.50		50.50		50.00		49.50		48.50		48.65		47.50		47.00		46.50		45.50		44.50		42.50
Bar crops and plate	12	49.00		49.00		48.00		47.50		47.00		46.00		46.15		45.00		44.50		44.00		43.00		42.00		40.00
Punchings and plate	14	46.50		46.50		45.50		45.00		44.50		43.50		43.65		42.50		42.00		41.50		40.50		39.00		37.50
Electric furnace bundles	15	46.00		46.00		45.00		44.50		44.00		43.00		43.15		42.00		41.50		41.00		40.00		39.00		37.00
Cut struct., plate, 3 ft and less	16	47.00		47.00		46.00		45.50		45.00		44.00		44.15		43.00		42.50		42.00		41.00		40.00		38.00
Cut struct., plate, 2 ft and less	17	49.00		49.00		48.00		47.50		47.00		46.00		46.15		45.00		44.50		44.00		43.00		42.00		40.00
Cut struct., plate, 1 ft and less	18	50.00		50.00		49.00		48.50		48.00		47.00		47.15		46.00		45.50		45.00		44.00		43.00		41.00
Foundry steel, 2 ft and less	20	44.00		44.00		43.00		42.50		42.00		41.00		41.15		40.00		39.50		39.00		38.00		37.00		35.00
Foundry steel, 1 ft and less	21	46.00		46.00		45.00		44.50		44.00		43.00		43.15		42.00		41.50		41.00		40.00		39.00		37.00
Heavy trimmings	24	43.00		43.00		42.00		41.50		41.00		40.00		40.15		39.00		38.50		38.00		37.00		36.00		34.00
Hard steel, 2 ft and less	30	49.00		49.00		48.00		47.50		47.00		45.00		46.15		45.00		44.50		44.00		43.00		42.00		40.00
No. 1 RR heavy melting	RR 1	46.00		46.00		45.00		44.50		44.00		43.00		43.15		42.00		41.50		41.00		40.00		39.00		37.00
Scrap rails, random lengths	RR 14	48.00		48.00		47.00		46.50		46.00		45.00		45.15		44.00		43.50		43.00		42.00		41.00		39.00
Scrap rails, 3 ft and less	RR 16	51.00		51.00		50.00		49.50		49.00		48.00		48.15		47.00		46.50		46.00		45.00		44.00		42.00
Scrap rails, 2 ft and less	RR 17	52.00		52.00		51.00		50.50		50.00		49.00		49.15		48.00		47.50		47.00		46.00		45.00		43.00
Scrap rails, 18 in. and less	RR 18	54.00		54.00		53.00		52.50		52.00		51.00		51.15		50.00		49.50		49.00		48.00		47.00		45.00
Rerolling rails	RR 15	53.00		53.00		52.00		51.50		51.00		50.00		50.15		49.00		48.50		48.00		47.00		46.00		44.00
Uncut tires	RR 20	48.00		48.00		47.00		46.50		46.00		45.00		45.15		44.00		43.50		43.00		42.00		41.00		39.00
Cut tires	RR 21	51.00		51.00		50.00		49.50		49.00		48.00		48.15		47.00		46.50		46.00		45.00		44.00		42.00
Cut bolsters and side frames	RR 23	49.00		49.00		48.00		47.50		47.00		46.00		46.15		45.00		44.50		44.00		43.00		42.00		40.00
RR specialties	RR 24, 28, 29	51.00		51.00		50.00		49.50		49.00		48.00		48.15		47.00		46.50		46.00		45.00		44.00		42.00
Solid steel axles	RR 25	58.00		58.00		57.00		56.50		56.00		55.00		55.15		54.00		53.50		53.00		52.00		51.00		49.00
No. 3 steel wheels	RR 27	51.00		51.00		50.00		49.50		49.00		48.00		48.15		47.00		46.50		46.00		45.00		44.00		42.00
Unassorted	RR 35	40.00		40.00		39.00		38.50		38.00		37.00		37.15		36.00		35.50		35.00		34.00		33.00		31.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall. Cincinnati: Newport. St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland. Claymont: Chester. Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a $6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, $9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, $8 from base.

COMMISSIONS — Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: **Nickel:** $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum:** $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese:** $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon:** electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium:** $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys:** if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling price on billet, bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

See Amend. 5 to CPR for setting of single price on No. 1 Heavy, No. 2, and No. 1 bundles. No. 1 bundles are made prime grade from which to add or subtract differentials. Amendment also puts dealer to dealer sales under ceilings, permitting a $1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	35.00
Bushelings	30.00
Bushelings, prepared new factory	31.00
Bushelings, unprepared new factory	28.00
Short steel turnings	32.00
Mixed borings, turnings	32.00
Cast scrap	55.00

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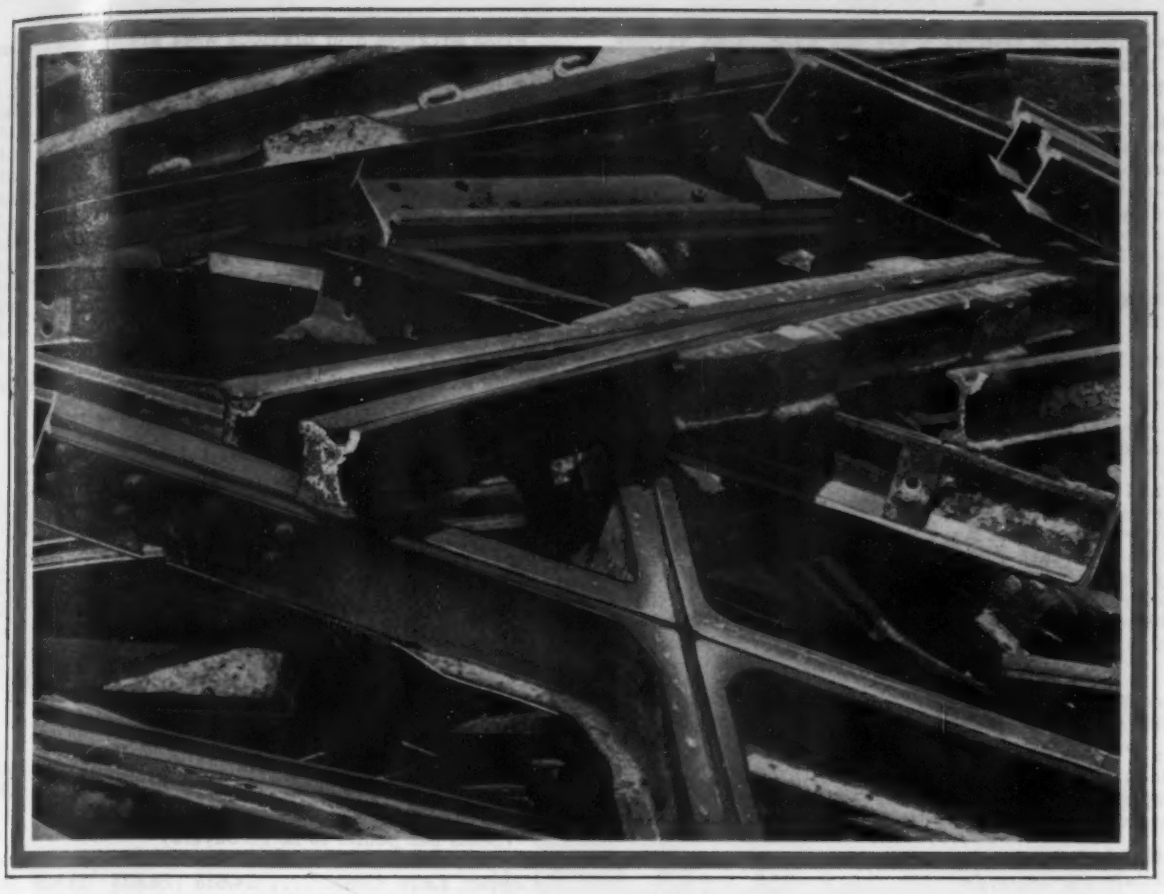

uncut frogs and switches

use:

Uncut frogs and switches are a good grade of scrap for the Open Hearth Furnace when they are cut to not more than 5 feet in length to fit the charging pan. Being a heavy scrap, it offers an economical charge and is relatively free of oxide, dirt and rust. This type of scrap is also valuable when cut and utilized as rail crop.

source:

Obsolete railroad frogs and switches.

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specifications:

Uncut Frogs and Switches with or without Manganese (A.A.R. Nos. 18 & 18-A) Steel and/or iron frogs and switches that have not been cut apart. May include Manganese.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Nov. 20, 1951	Nov. 13, 1951	Oct. 23, 1951	Nov. 21, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	34.50
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	4.15
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302).	31.50	31.50	31.50	30.00
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron (per gross ton)	Nov. 20, 1951	Nov. 13, 1951	Oct. 23, 1951	Nov. 21, 1950
No. 2 foundry, del'd Phila.	$57.97*	$57.97	$57.97	$54.77
No. 2, Valley furnace	52.50	52.50	52.50	49.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	52.58
No. 2, Birmingham	48.88	48.88	48.88	45.88
No. 2, foundry, Chicago†	52.50	52.50	52.50	49.50
Basic del'd Philadelphia	57.09*	57.09	57.09	53.92
Basic, Valley furnace	52.00	52.00	52.00	49.00
Malleable, Chicago†	52.50	52.50	52.50	49.50
Malleable, Valley	52.50	52.50	52.50	49.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	181.20

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.
*Effective with Oct. 4 freight increase.

Scrap: (per gross ton)	Nov. 20, 1951	Nov. 13, 1951	Oct. 23, 1951	Nov. 21, 1950
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$43.75
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	38.75
No. 1 steel, Chicago	41.50*	41.50*	41.50*	39.75
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.25
Low phos. Young'n	46.50*	46.50*	46.50*	46.25
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	60.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	55.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	61.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	Nov. 20, 1951	Nov. 13, 1951	Oct. 23, 1951	Nov. 21, 1950
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York.	$1.03†	$1.03	$1.03	$1.44
Zinc, East St. Louis	19.50	19.50	19.50	17.50
Lead, St. Louis	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	51.22
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	50.00	42.00	42.00	32.00

†Tentative.

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Nov. 20, 1951	4.131¢ per lb.	$52.72 per gross ton	$42.00 per gross ton
One week ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One month ago	4.131¢ per lb.	52.72 per gross ton	42.00 per gross ton
One year ago	3.837¢ per lb.	49.69 per gross ton	40.75 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.72 Oct. 9	$52.69 Jan. 2	$47.75 Jan. 30	$42.00 Oct. 23
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[11]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$88.00[11]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4]	$70.00[1,6]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[11]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]		4.10[15]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[8,23]	3.60[1,6,9]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[23]	3.90[12] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[1,6]		4.35[3]			4.35[3]	5.05[32]	4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[64]					4.80[3]	5.50[32]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[6]						5.35[32]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[8],4.00[41,58],3.75[28] 3.50[5,7]	3.50[66]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.80[3]		4.40[47] 3.80[12]
Cold-rolled	4.65[5,7,9] 5.00[28] 5.35[40,63]	4.90[8,66]	4.90[8]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[13] 5.45[47] 5.60[64,81]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6,8],80[9]				4.95[4], 5.50[1] 5.40[13],5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[13]
Hi str. low alloy, c.r.	7.20[9]			6.55[2] 6.70[5]			6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[5,11]; $7.35[22] 0.50 lb, add 25¢; 0.75 lb, add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[18]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[11] 4.80[64]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4,6]		3.70[3,6]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,33,70]	4.55[4,71,73]	4.55[2]	4.55[4,52]		4.55[6,57]		4.60[70]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[11] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,33,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,52]		5.40[6,28,57]	5.40[3]	5.40[3]					5.55[24] 5.80[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,3] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,33]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[23]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[6]	5.65[4,5]			5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[18]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo—4.95[30] 4.85[33]			4.85[3]	4.95[3]	Duluth—4.85[2]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

UNIVERSITY OF MICHIGAN LIBRARIES

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$82.00[52]		F=$80.00[19]		Alloy, net ton
		$66.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[52]	$66.00[11]	F=$85.00[19] SF, LS, S=$85.00[52]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[52]		F=$89.00[19] LA=$90.00[52]		Alloy net ton
				Alton=4.40[32] Worcester=4.40[3] Minnequa=4.35[14] Portsmouth=4.30[20]	PIPE SKELP
	4.50[52]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]		WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[24], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.60[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[83]	Alton=3.95[32] Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[2], 5.85[83] Trenton=6.00[45]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[52] S=6.30[52]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[52]	3.70[4,11]	SF, LA=4.40[24]	Alton=4.15[32] Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.20[83]	4.10[83]	3.70[4,11]	SF, S=4.45[52] F=4.40[19], LA=4.40[52]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=600[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[52] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[3] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19], SF, S=6.30[52] LA=6.25[52]	Claymont=4.15[29] Coatesville=4.15[21] Harrisburg=6.75[36] Minnequa=4.50[14] Geneva=3.70[16]	Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[52]		PLATE Carbon steel
				Harrisburg=6.75[36]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[52]	Geneva=5.55[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[52], F=4.25[19] LA=4.25[24,62], S=4.30[52]	Geneva 3.65[16] Minnequa 4.10[14] Phoenixville=6.25[56]	SHAPES, Structural
		5.50[11]	S=6.10[83], F=6.10[19] SF=6.00[52], LA=6.05[52]	Geneva=5.50[16]	Hi str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Alton=5.05[32] Atlanta=5.10[65], Worcester=5.15[3], Minnequa=5.10[14], Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128-lb, deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., Alton, Ill.
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide, Mckeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel, San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.
105 Tonawanda Iron Div., N. Tonawanda, N. Y.
106 Pilgrim Drawn Steel Div., Automotive Materials Corp., Plymouth, Mich.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	38.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4, 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4, 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13 (type 301 add ¼¢); Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

*ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 Series.

WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv.(1) ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Allquippa, Pa.-5	118	132	....	....	138	140	5.70	6.15
Atlanta-65	121	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	....	123	143	143	5.70	6.15
Buffalo-85	....	....	....	....	....	....	4.85	....
Cleveland-86	125	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	140	140	5.70	6.15
Duluth-2	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	140	5.70	6.15
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	6.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	142	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	....	....	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline- Ill.-4	....	....	136	....	....	....	....	....
Pittsburg, Cal.-24	137	....	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	140	140	5.70	6.15
So. Chicago, Ill.-4	118	128	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows, Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	....	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va., (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago $105.30 to $108.80
6 to 24-in., del'd N.Y.... 108.50 to 109.50
6 to 24-in., Birmingham 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less .....$123.00 to $130.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ in.		¾ in.		1 in.		1¼ in.		1½ in.		2 in.		2½-3 in.		2 in.		2½-3 in.		3½-4 in.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill.-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill.-32	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pct higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 19.50¢.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70	....	....	....	....	....
Chicago-4	....	....	....	6.15	....	....	....	....
Cleveland-3	....	....	....	....	....	9.35	....	....
Ensley-11	3.60	4.00	....	....	....	....	....	....
Fairfield-11	....	4.00	4.70	6.15	5.60	....	4.50	9.85
Gary-1	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor-6	3.60	....	4.70	6.15	5.60	....	4.50	....
Johnstown-3	....	4.00	....	....	5.60	....	....	....
Joliet-1	....	4.00	4.70	....	....	....	....	....
Kansas City-83	....	....	....	6.40	....	....	....	9.85
Lackawanna-3	3.60	4.00	4.70	....	....	....	4.50	....
Lebanon-3	....	....	....	6.15	....	9.35	....	9.85
Minnequa-14	3.60	4.50	4.70	6.15	....	....	4.50	....
Pittsburgh-3	....	....	....	....	....	9.35	....	9.85
Pittsburgh-77	....	....	....	....	....	9.35	....	....
Pittsburgh-78	....	....	....	....	....	....	....	9.85
Pittsburgh-5	....	....	....	6.15	....	....	....	....
Pittsburgh-24	....	....	....	....	....	....	4.65	....
Seattle-62	....	....	....	6.65	....	....	4.65	....
Steelton-3	3.60	....	4.70	....	....	....	4.50	....
Struthers-6	....	....	....	6.15	....	....	....	....
Torrance-24	....	....	....	....	....	....	4.65	....
Youngstown-4	....	....	....	6.15	....	....	....	....
Cleveland-4	....	....	....	....	....	9.35	....	....

BOILER TUBES

$ Per 100 ft. cut, 10 to 24 ft

F.o.b. Mil	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.98	25.86
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.36
	4	10	52.60	61.88	51.03	60.03
National Tube	2	13	21.82	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.99	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.59	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.10	....	....

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

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Miscellaneous Prices

WAREHOUSES

Base price, f.a.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢.)

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.80	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.80	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.80	6.40	7.74–8.06	5.86	.....	6.05	5.80	5.80	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.80	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	5.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.65	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–6.62	6.33–6.45	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.98	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	6.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.80	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise, keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.
EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.a.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-83	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-85	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	57.00	57.50	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....
N. Tonawanda, N. Y.-105	.....	52.50	53.00	.....	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50, pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosili on prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick — *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite — *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.75

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	25.00
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*) — *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-58	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-46	.....	6.80	7.40	9.35	11.65

Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg Reg.	K. Reg.	Less Keg Hvy.	K. Hvy.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.	Hvy.		
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb.
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Pel lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b., mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn., Pa. (39)	*29.5	
Claymont, Del. (29)	$28.00	
Conshohocken, Pa. (26)		*27.50
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	$81.0
6	4	2	6	—	96.5¢
High-carbon chromium					63.5¢
Oil hardened manganese					35¢
Special carbon					32.5¢
Extra carbon					27¢
Regular carbon					23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to $3.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd.	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15	...	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	...	7.25	8.50	9.30	9.85	...	...
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	...	7.95	9.20	...	...	...	...
Ind. Harbor-3	6.75	7.25	...	...	...	...	...
Mansfield-75	7.25	7.75	9.00	9.80	...	...	...
Niles, O.-64	7.05	7.55	...	...	...	...	...
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			32.00
62-66% Cr, 4-6% C, 6-9% Si			32.60

Foundry Ferrochrome

Contract prices, cents per lb of alloy. Noncontract prices add 0.25¢ per lb.

High carbon 8 mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	23.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.10
0.50% max. C.	1.10
9 to 11% C.	1.00

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dumped, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.80

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

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Ferroalloy Prices

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.
f.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O. $185
f.o.b. Johnstown, Pa. $187
f.o.b. Sheridan, Pa. $185
f.o.b. Etna, Clairton, Pa. $188
$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 34.75
Ton lots 36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn.....19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 16-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe..... 21.70
97% Si, 1% Fe..... 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.
Carload, bulk 6.95
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25-30% Si.....	20.00	75% Si.....	14.30
20-25% Si.....	12.40	85% Si.....	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd. Mn 85-90%.

	Carloads	Ton	Less
0.5% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C.....	25.75	27.60	28.80
0.15% max. C.....	25.25	27.10	28.30
0.30% max. C.....	24.75	26.60	27.80
0.50% max. C.....	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si.....	21.25	23.10	24.30

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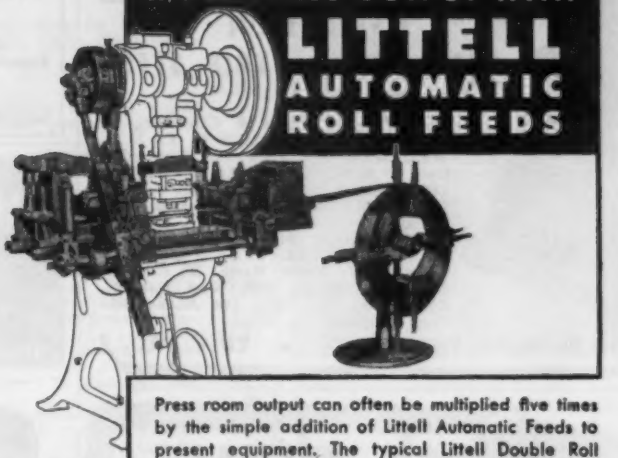

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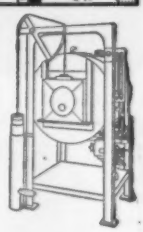

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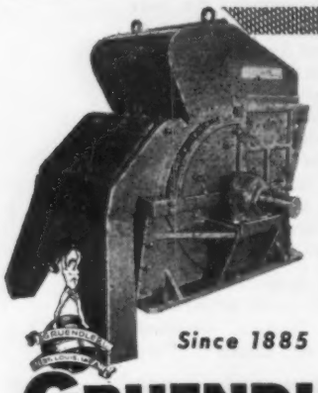

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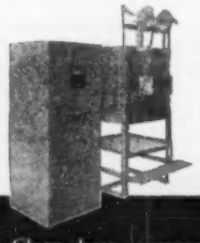

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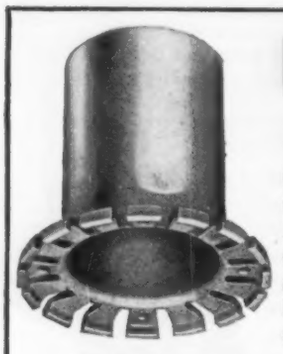

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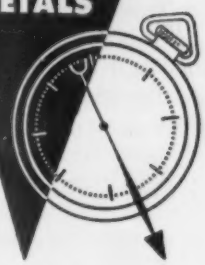

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Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 9.90¢
Ton lots ..... 11.30¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro - Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max. f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15% contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents
Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.35

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, Ti, 15-21% B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .35
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 68¢
No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Last Friday a committee representing 66 firms from Maryland to Massachusetts was scheduled to be seated at the round table with OPS officials. Subject was CPR 80.

This committee echoed the opinion of some in the used machinery field without facilities to rebuild or recondition and who say base period prices are too low.

Objections — Theme of complaints centered on an overload of paperwork, extreme difficulty in getting new prices, inconsistencies in the order, "impossible" rebuilding and reconditioning clauses, and an unjust base period for percentage pricing. The committee also went on record that CPR 80 contradicted principles of the Capehart Amendment to the Defense Production Act.

What's your reaction to CPR 80? Address replies to Clearing House, The Iron Age, 100 E. 42 St., New York 17, N. Y.

They pointed to new machine tool builders who had the privilege of adding on higher costs and to the low base period restrictions of CPR 80. Solution, they suggested, would be a broadly-amended CPR 80 to allow them, among other things, to price to the percentage of new tool prices *on the date of sale* of the used machine.

Hurts Industry—The committee was prepared to tell OPS that CPR 80 had slowed business and that it would "legislate smaller dealers out of business."

Among the charges the committee brought before OPS were: (1) The system of percentage pricing was inequitable, and some "as is" ceilings were too low; (2) Rigid reconditioning, rebuilding clauses really ban any one other than rebuilders and reconditioners from dealing in modern or desired equipment; (3) Non-rebuilders were far from adequately represented when CPR 80 was written up.

Suggestions — The committee urged that CPR 80 be amended to: (1) Price by date of sale of used tool, not by base period; (2) Include a price book listing for new builders; (3) Age group 6 in the pricing table (tools made before Jan., 1916) should be lifted into age group 5; (4) Return to the OPA system of equivalency for rebuilding, reconditioning. CPR 80 should permit dealers to sell a tool as rebuilt or reconditioned if they list it as equivalent to the new tool on the invoice and offer a 30-day guarantee.

(5) Make simple certification that dealer has complied with CPR 80 instead of voluminous paperwork certifying to many specific CPR 80 clauses; (6) Establish procedure for auction sales.

(7) Modify rebuilding specs to put them in the "if necessary" class and make the testing clause practical by keeping "substantially" to tolerances; (8) Include right to repair worn part when sensible rather than replace; (9) Make possible sale of reconditioned category tools with test but without test but with 30-day guarantee. Testing under power is not feasible in many cases; (10) Exclude metal fabricating machine from definition of machine tool since this equipment shows much slower obsolescence rate.

Changes Mind—One dealer told THE IRON AGE that he was against for price controls on used machines until he saw CPR 80. Then changed his mind fast. On the other side of the fence, dealers with facilities to fit under rebuilding and reconditioning categories are pleased with the order and insist that CPR 80 establish standards for good work.

The smaller firm counters that these specs amount to his dealer warrant. He says that he wants price control stability in the used market, realized that while the U. S. economy was under control used machines could not stay on side—but wants a better order.

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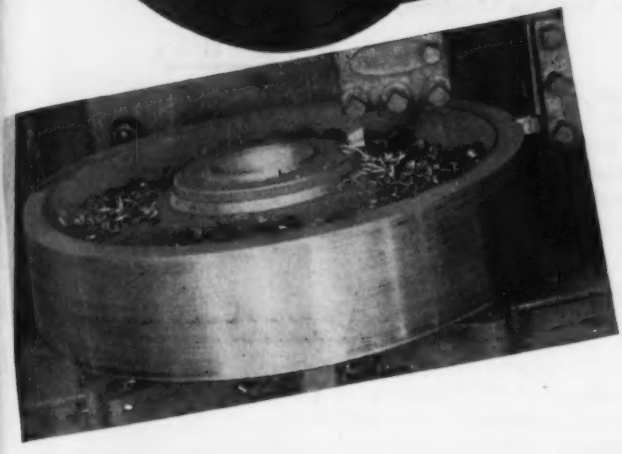

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